RAILROAD GAZETTE

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SAFETY-VALVES.

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Introductory Note.—The writer, in presenting these remarks to engineers, does not pretend to offer much that is original, but has aimed to gather what is valuable from the great mass of material to be found in scientific periodicals and in publications that are not generally accessible. An endeavor has been made to systematize the treatment of the subject, and to give such varied solutions of the problems that arise in proportioning the parts of safety-valves as to render them plain to those who have not an elementary education. The importance of having the general principles of safety-valves understood by those who are charged with the care of steam machinery cannot well be over-estimated. With a safety-valve that is in reality all which its name implies, a large proportion of the risks incident to the use of boilers will be avoided; while on the other hand, a safety-valve that is only such in name is one of the readiest assistants to a disastrous boiler explosion. These remarks lead naturally to the consideration of the first part of the subject.

I. The Requisite Qualifications of a Safety-Valve.—As this instrument is designed to prevent the accumulation of pressure in a steam boiler beyond a certain point, it is necessary that the parts should be so proportioned that the valve will rise when the given pressure is attained. Until the valve rises it is subjected to the pressure of the steam at rest, so that this part of the subject involves the statical condition of a safety-valve. As soon as the pressure of the steam in a boiler lifts the safety-valve, new conditions are introduced, because the steam that acts upon the valve is in motion, escaping through the orifice between the valve and seat. It will thus be evident that from the time the valve is raised until it is again seated by the reduction of the steam pressure the dynamical conditions are to be regarded. A good safety-valve should be so constructed that not only will it lift when the required pressure is attained, but so that it will also prevent the further increase of pressure, and will close promptly as soon as that pressure is reduced.

II. Proportioning the parts of safety-valves, in order that they may rise with given pressures.—This part of the subject, as already remarked, deals with the statical condition of safety-valves. In other words, it is a question of the equilibrium of two forces acting in contrary directions—one, a weight or the tension of a spring, tending to hold the valve down; and the other, the pressure of the steam, tending to raise it. When these opposing forces balance each other the valve is ready to lift, and any slight increment of pressure will raise it. It is, then, the conditions of the balancing or equilibrium of the steam pressure and the spring or weight that are to be considered. In some forms of safety-valves, a spring or weight is placed directly above the valve, and resists the upward pressure of the steam; or a weight is suspended directly under the valve, passing into the boiler. In other forms, the spring or weight is attached to a lever, to which the valve is also connected, the weight or spring being ordinarily at a greater distance from the fulcrum than the valve is. In the first form of construction, in which the steam pressure is opposed directly by the force of a weight or spring, without the intervention of a lever, these two forces will evidently balance when they are equal to each other. It is only necessary, therefore, to multiply the pressure of the steam in pounds by the area of the valve in square inches to find what weight must be attached, or what tension put upon the spring, to prevent the valve from rising before this pressure is reached. For example, suppose that a valve has a diameter of 4 inches, and is required to rise when the steam pressure is 100 pounds per square inch, what weight must be attached to it?

The area of a valve having a diameter of four inches is about.....12 9-16 square inches.
Multiply by 100

Weight to be attached to valve.....1,256¼ pounds.

In the second case, where a lever is employed, it is evident that the forces will not balance if they are equal, since they act at different points of the lever. Fig. 1 is a sketch of an

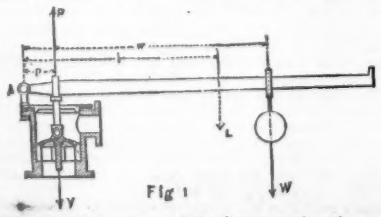


Fig 1

ordinary lever safety-valve, and the forces acting in a case of his kind are represented graphically by arrows, the directions in which they point corresponding to the directions in which the forces act. It will be seen that there are four forces:

1. The weight, represented by the arrow W.
2. The weight of the lever, represented by the arrow L.
3. The weight of the valve and stem, represented by the arrow V.
4. The pressure of the steam, represented by the arrow P.

The latter force, the pressure of the steam, is the pressure per square inch multiplied by the area of the valve in square inches. The lever is arranged so that it can turn about the point *A* as a fulcrum. The first three forces tend to keep the valve down and the fourth force tends to raise it, and all the forces act vertically. The lever arm of a force is the distance from the force to the fulcrum, *measured on a line that is drawn perpendicular to the direction of the force.* As these forces act vertically, the lever arms must be measured on horizontal lines—and it will be seen that there are three lever arms to be considered:

1. The lever arm of the weight, represented by *w*.
2. The lever arm of the lever represented by *b*.
3. The lever arm of the valve, represented by *p*.

The lever arms of these forces are the horizontal distances from the centres of gravity of the weight, lever, and valve, respectively, to the fulcrum. The centres of gravity of the weight and valve are ordinarily in vertical lines passing through their centres, and the centre of gravity of the lever is most readily determined by balancing it upon a knife edge, the centre of gravity being on a vertical line passing through the point on which it balances.

To recapitulate, there are eight quantities that may be varied, in proportioning a safety valve, viz.:

1. The weight.
2. The weight of the lever.
3. The weight of the valve.
4. The diameter of the valve.
5. The lever arm of the weight, or its position on the lever.
6. The lever arm of the lever, depending upon its form.
7. The lever arm of the valve.
8. The pressure of the steam, in pounds per square inch.

Any seven of these parts may be proportioned at pleasure, and the remaining one can be determined, the sole condition being that the valve shall rise as soon as a given pressure is exceeded. Ordinarily, however, there are only two cases that require solution:

1*st. With what steam pressure will a given valve rise?* 2*d. Where must the weight be placed on the lever of a given safety-valve in order that the valve may rise when a certain steam pressure is reached?* These problems can be solved either by experiment or calculation. Both methods will be explained. First ascertain the weights of the ball, lever and valve, the diameter of the valve, the center of gravity of the lever, and the lever arms of the weight, lever and valve. The lever arms of the weight and valve can be measured directly, and the lever arm of the lever, or the horizontal distance from its center of gravity to the fulcrum, can be determined by balancing it upon a knife-edge, as already explained. In measuring the valve, if the seat is beveled and the valve fits well, the smallest diameter is to be taken. Then provide a bar, *A B*, Fig. 2, of uniform

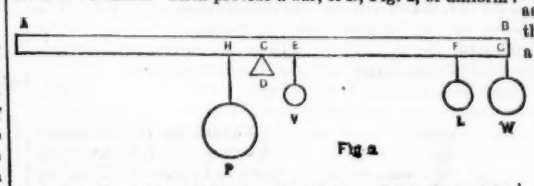


Fig 2

section, as least twice as long as the distance from the weight to the fulcrum of the given valve. Mark the center-point, *C*, of the lever, and mark points, *E*, *F*, *G*, to the right of the center, such that the distance *C E* is the same as the horizontal distance of the center of the valve from the fulcrum. *C F* is the horizontal distance from the center of gravity of the lever to the fulcrum, and *C G* the horizontal distance from the center of the weight to the fulcrum, if this is known. Also lay off to the left of the center a distance, *C H*, equal to *C E*. Balance the bar upon a knife-edge, *D*, and the apparatus will be ready for making the required determinations.

1*st. To find with what steam pressure the valve will rise.*—Hang on the ball at the point *G*, the lever at *F*, and the valve at *E*, or attach equivalent weights, as may be most convenient. Then hang on weights at the point *H*, until they just balance the weights on the other side of the centre, and bring the bar to a horizontal position. Ascertain the area of the valve in square inches, and divide the weight at *H* by this area. The result will be the required pressure of the steam, in pounds per square inch.

2*nd. To find where to place the weight on the lever of a given safety valve, in order that the valve may rise with a given steam pressure.*—Multiply the area of the valve in square inches by the pressure of the steam in pounds per square inch, and attach a weight at *H* equal to this product. Also hang on the valve and lever, or equivalent weights, at *E* and *F*, as before, and move the ball along the bar until it balances the other weights. The distance from *C*, of the point at which it balances will be the horizontal distance from the fulcrum to the weight, on the lever of the given safety-valve.

To facilitate the only calculation required in this experimental method, the areas of valves are given below, for the majority of cases that occur in practice:

Table of Areas of Valves of Different Diameters.

Diameter of valve in inches.	Area of valve in square inches.
¼ or 0.5	13-64 or 0.19635
⅝ or 0.625	5-16 or 0.30680
¾ or 0.75	7-16 or 0.44179
⅞ or 0.875	19-32 or 0.60132
1	25-32 or 0.7854
1¼ or 1.25	1 15-64 or 1.2272
1⅜ or 1.5	1 49-64 or 1.7671
1¾ or 1.75	2 13-32 or 2.4053
2	3 9-64 or 3.1416
2½ or 2.5	4 29-32 or 4.9087
3	7 1-16 or 7.0686
3½ or 3.5	9 5-8 or 9.6211
4	12 9-16 or 12.5664
4½ or 4.5	15 29-32 or 15.9043
5	19 41-64 or 19.635
5½ or 5.5	23 49-64 or 23.7583
6	28 9-32 or 28.2744

The method here described is exceedingly simple and accurate, and will, it is hoped, find favor with those who have difficulty in using the ordinary modes of calculation. It is not uncommon for the graduations on many safety-valves to be wrongly marked, and it is important for steam users to know certainly whether or not they are correct.

The statical problems in connection with safety-valves can also be solved graphically or by construction. A force can be represented in intensity and direction by a straight line, by assuming some unit of length for the unit of intensity. For instance, if the force is 5 pounds, it may be represented by a line ⅝ of an inch in length. To simplify the graphical solution, the several constructions upon which it depends will be presented separately.

1. *Two or more parallel forces, acting in the same direction on a lever, being given, to find the direction, intensity, and point of application of a single force which can replace them and produce the same effect.*

In Fig. 3, the lever, *A B*, is acted upon by two parallel forces, *C D*, and *E F*. Lay off horizontally to the right of *E*, and the left of *C*, any two distances, *E a*, *C b*, equal to each other. From *a* draw *a c* parallel to *E F*, and from *F* draw *F c* parallel to *E a*, forming a rectangle, *E a F c*, on the two adjacent sides, *E a*, *E F*. Also complete the rectangle, *C b d D*, of which *C b* *C D* are the adjacent sides. Through the points *C* and *E* draw

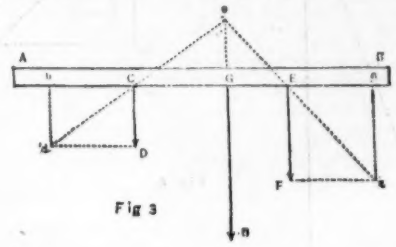


Fig 3

diagonals, *d C*, *c E*, to the two rectangles, and produce them until they meet in the point, *e*. Through *e* draw a line, *e H*, parallel to *C D* and *E F*, and the point *G*, in which it cuts the lower line of the lever, will be the point of application of a force which will singly produce the same effect as the two forces, *C D*, *E F*. Make *G H* equal to the sum of *C D*, and *E F*, and it will represent the intensity of the required force, which is called the resultant of the other two forces.

If there were three forces to be replaced by a single one, after finding the force that is equivalent to two of them, consider this and the third force as two single forces, and proceed as before. In this way any number of parallel forces acting in the same direction can be replaced by their resultant, which is a single force, equivalent in effect to all the others.

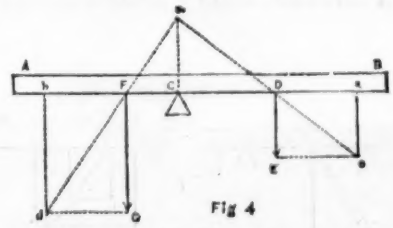


Fig 4

2. *The intensity and point of application of a vertical force acting on a lever being given, also the position of the fulcrum, to find the intensity of a parallel force, acting at a given point of the lever, which will balance the first force.*

D E, Fig. 4, is the given force, *C* the fulcrum, and *F*, the point at which the required force must act and balance *D E*. Draw a vertical line, *C c*, from the fulcrum. Lay off, to the right of *D* and the left of *F*, any two distances, *D a*, *F b*, equal to each other. Complete the rectangle, *D a c E*, and draw a vertical line, *b d*, from the point *b*. Through *D*, draw a diagonal to the rectangle *D a c E*, and produce it until it meets the vertical line through the fulcrum in the point *c*. From *c*, draw a line through *F*, the point of application of the required force, continuing it until it meets the vertical line drawn from *b* in the point *d*. Complete the rectangle of which *b F b d*, are the adjacent sides, and *F G* will be the force required to balance *D E*.

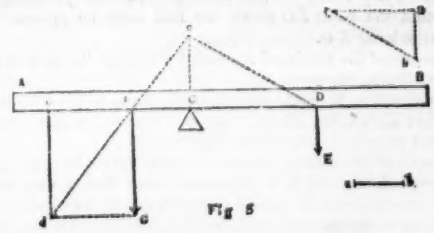


Fig 5

3. *The intensity and point of application of one vertical force the intensity of a second parallel force, and the position of the fulcrum being given, to find the point of application of the second force, in order that it may balance the first one.*

F G, Fig. 5, is the force whose intensity and point of application are given. *C* is the fulcrum, and *a b* is the intensity of the second force. Draw a vertical line, *C c*, from the fulcrum. Lay off from *F*, towards the left, any distance, *F c*, and complete the rectangle *F c d G*. Through *F* draw a diagonal to the rectangle, continuing it to *c*, where it meets the vertical line drawn from the fulcrum. In any convenient place, lay off a horizontal line, *f g*, equal to *F c*, and from the point *g* draw the perpendicular *g h*, equal to *a b*. Through the points *f* and *h*, draw the line *f h*, and from *c* draw a line, *c D*, parallel to *f h*. The point *D*, in which the line last drawn meets the lower side of the lever, is the point of application of the second force; and

D E, equal to *a b*, represents that force applied at such a point as to balance *F G*.

By the application of the graphical methods just explained, it will be easy to solve the problems previously determined by experiment.

1*st. To find with what steam pressure a safety-valve will rise.*—On the lever *A B*, Fig. 6, mark the fulcrum *C*. To the right of *C* lay off the distances *C D*, *C G*, *C I*, equal to the lever arms of the valve, the lever and the weight respectively; and to the left of *C* lay off the distance *C L*, equal to *C D*. Also draw vertical lines, *D F*, *G H*, *I K*, to represent the weights of the valve, lever and ball. Find by construction a single force, *P R*, which can replace these three forces and produce the same

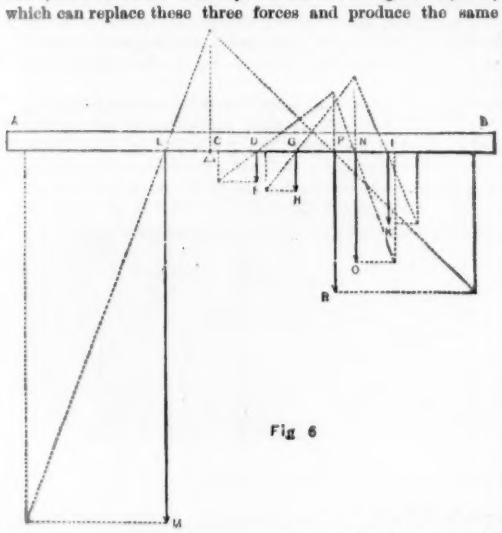


Fig 6

effect. This is done by replacing *G H* and *I K* by a single force, *N O*, and then finding a force, *P R*, which is equivalent to *N O* and *D F*. Then construct the force *L M*, which acts at the point *L* and balances *P R*, or the three forces, *D F*, *G H*, *I K*. *L M* represents the total pressure on the valve in pounds, and this, being divided by the area of the valve in square inches, will give the pressure of the steam, in pounds per square inch, at which the valve will rise.

2*nd. To find where to place the weight on the lever of a given safety-valve, in order that the valve may rise with a given steam pressure.*—In Fig. 7, *L M* represents the required pressure in pounds per square inch multiplied by the area of the valve in square inches, *D F* is the weight of the valve, *G H* is the weight of the lever, and *a b* is the weight of the ball, the points of ap-

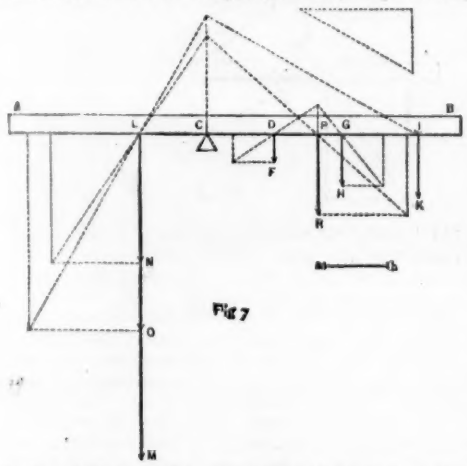


Fig 7

plication of all the weights, except that of the ball, being given. Replace *D F* and *G H* by a single force, *P R*, which will produce the same effect, and find *L N*, a force acting at *L*, and balancing *P R*. Subtracting *L N* from the whole force *L M*, there remains *L O*, which must be balanced by the weight of the ball *a b*. Then, by the third construction, previously given, find the point *I* at which the ball must be placed in order to balance *L O*.

In the use of the graphical method for testing the accuracy or proportioning the parts of safety-valves, the scale on which the construction is made should be as large as possible, in order that apparently trivial errors on a drawing may not be magnified greatly in the practical applications.

The mode of calculating the parts of safety valves from given or observed data will now be presented. And first it may be well to say something in regard to the means of ascertaining the weights of the various parts, and the position of the center of gravity of the lever. The most obvious method of determining the weight of anything is to weigh it, and the center of gravity of a lever is most readily found by balancing the lever upon a knife-edge. It is not always convenient, however, to make these experiments. Sometimes no facilities for weighing the parts are at hand, and in certain cases it may be necessary to make the calculations from such data as can be obtained from a drawing. When the parts can be removed, their weights can determined approximately by experiment. Immerse each part in water, using a shallow vessel, and mark how much the water rises, which will give, by a simple calculation, the volume of the part in cubic inches. Having ascertained the number of cubic inches in a part, the volume can be obtained by multiplying this number

By 0.2778, if the part is of wrought iron.
By 0.2604, " " " cast iron.
By 0.2917, " " " brass.

The weights so found will generally be only approximate, but will be tolerably accurate, if the experiment is carefully performed.

When only the dimensions of the parts are given, their volumes must be determined by calculation. The valve and weight will ordinarily present no difficulties, as they have forms for which rules are given in most works on mensuration, and their centers of gravity usually coincide with their geometrical centers. Having found their volumes in cubic inches, their weights can be obtained by multiplying these volumes by the weight of a cubic inch of the material, as given above. The lever, not unfrequently, is quite irregular in form, and the centre of gravity is scarcely ever in the middle of the bar. Whatever its shape, however, its volume can be found with great accuracy by the method to be explained. Make a drawing of the lever in plan and elevation, as shown in Fig. 8, *C D* being the plan, and *E F* the elevation, the form of the lever being much more irregular than will usually be

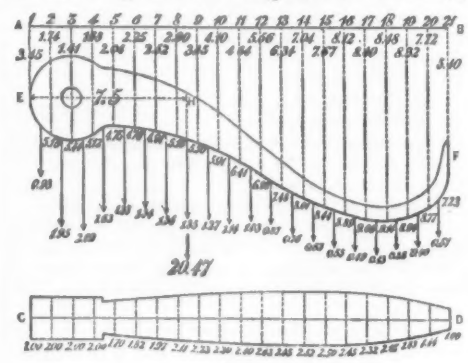


Fig 8

found in practice. To determine the volume of this lever in cubic inches, it will be necessary to find the area of one face, as, for instance, the elevation and the mean width of the other. In finding the mean width, the area of the face represented on the plan will first be calculated, and then divided by the length. To calculate the area of either of these faces, divide it into any even number of parts, by equi-distant lines drawn perpendicular to any line assumed, as may be most convenient. Thus, in Fig. 8, the elevation is so irregular that a straight line would not lie wholly within it, and *A B* is drawn without, and the elevation is divided into 20 parts, by equi-distant lines perpendicular to *A B*. In the plan, the line *C D* is within the figure, and the same number of equi-distant lines are drawn, perpendicular to *C D*. These perpendicular lines are called ordinates, and it will be observed that as the number of divisions of a face is even, the number of ordinates is uneven. Number the ordinates from first to last, 1, 2, 3, 4, etc., and measure their lengths, either between the boundaries of the faces or between the boundary on one side, and the straight line, which is called the base. Then the area of a face, or the area between the base and the boundary on one side (according to the manner in which the ordinates are measured), can be found by the following rule:

Add together, the first and last ordinates, four times the sum of the even numbered intermediate ordinates, twice the sum of the odd numbered ordinates, and multiply the sum by one-third of the distance between any two consecutive ordinates.

In Fig. 8, the lever is supposed to be 20 inches long, and the distance between ordinates is one inch, so that there are 20 divisions, and 21 ordinates. This example is merely for the sake of illustration. Where great accuracy is required, the ordinates should be taken much closer together. The lengths of the ordinates are shown on the drawing, the dimensions being in inches. The diameter of the hole in the lever is 9-10 of an inch. To find the area of the elevation, the area included between the base *A B* and the boundary of the figure nearest to it will be calculated and subtracted from the whole area between the base and the outside boundary. The following are the calculations:

AREA BETWEEN BASE AND NEAREST BOUNDARY.

Extreme ordinates.	Even-numbered ordinates.	Odd-numbered ordinates.
1.....3.45	2.....1.74	3.....1.41
21.....5.40	4.....1.68	5.....2.04
	6.....2.25	7.....2.52
8.85	8.....2.90	9.....3.45
	10.....4.10	11.....4.84
	12.....5.56	13.....6.34
	14.....7.04	15.....7.67
	16.....8.12	17.....8.40
	18.....8.48	19.....8.32
	20.....7.72	
	49.59	44.99

Sum of even-numbered ordinates	49.59
Multiply by	4
	198.36
Sum of odd numbered ordinates	44.99
Multiply by	2
	89.98
Add	198.36 / 8.85
	297.19
Multiply by	⅓
Area between base and nearest boundary (square inches)	99.06

AREA BETWEEN BASE AND OUTSIDE BOUNDARY.

Extreme ordinates.	Even numbered ordinates.	Odd numbered ordinates.
1.....3.45	2.....5.13	3.....5.44
21.....5.40	4.....5.12	5.....4.75
	6.....4.76	7.....4.91
8.55	8.....5.15	9.....5.50
	10.....5.91	11.....6.41
	12.....6.92	13.....7.48
	14.....8.01	15.....8.44
	16.....8.89	17.....9.05
	18.....9.14	19.....8.94
	20.....8.77	
	67.80	60.92

	67.80
	4
	271.20
	60.92
	2
	121.84
	271.20
	8.55
	403.72
	⅓
Area between base and outer boundary, square inches	134.57
Subtract	99.06
Area of elevation of lever, square inches	35.51

AREA OF PLAN OF LEVER.

1.....2.00	2.....2.00	3.....2.00
21.....1.00	4.....2.00	5.....1.70
	6.....1.82	7.....1.97
3.00	8.....2.11	9.....2.23
	10.....2.30	11.....2.40
	12.....2.43	13.....2.45
	14.....2.52	15.....2.50
	16.....2.45	17.....2.32
	18.....2.15	19.....1.83
	20.....1.44	
	21.22	19.40
	4	2
	84.88	38.80
		84.88
		3.00
		126.68
		⅓
Area of plan of lever, in square inches		42.23
Divide by length of lever		20)42.23
Average width of plan		2.11
Average width of plan		2.11
Multiply by area of elevation		35.51
Volume of lever in cubic inches		74.9261
Deduct volume of hole		1.2723
		73.6538
Multiply by weight of a cubic inch of wrought iron		0.2778
Weight of lever, in pounds		20.47

This method of finding the area of an irregular figure is very useful in many cases that arise in practice. It will be a good plan for the reader to calculate the weight of a lever in the manner here explained, and compare it with the weight as ascertained by trial.

[TO BE CONTINUED.]

MASTER CAR BUILDERS' ASSOCIATION.

Ninth Annual Convention.

We resume the summary of the proceedings of the Convention this week, beginning at the close of the discussion on car wheels.

The report of the Committee on Brakes, etc., was then read and accepted. A summary has already been published.

The report of the Committee on Passenger and Freight Car Frames was then read.

Mr. DAVENPORT said that a number of the models of frames submitted had been sent to the Stevens Institute of Technology and tested, which could not be done at the rooms of the Association. A detailed report had been handed to him, which there was not time to read.

On motion, a vote of thanks was unanimously tendered to the Stevens Institute of Technology, and especially to Professors Thurston and Wood, and the students who made the report, for the interest taken by them in the Association, and for their kindness in testing, without compensation, the materials and models furnished them.

A member called attention to the model submitted by Mr. Smith, of the Cleveland, Columbus, Cincinnati & Indianapolis, in which the iron trusses were put in on an angle running from over the bolster through the plate down through the side of the sill towards the center.

Mr. HILDRUP thought it would be advisable for speakers to refer to the models.

Mr. CHAMBERLAIN had submitted three models. The first was a frame without any iron underneath the post or brace. This had yet to be tested. The second one was framed differently from the first, with iron underneath the braces. The third one was ironed underneath all the posts and braces. In each case there was a model with the boarding up and down and one with the boarding lengthwise, so that the frames could be tested alone and with the boarding on. There was no inside lining.

Mr. KIRBY said the inside lining made a difference. If the inside boarding ran the same way then there was a reverse boarding.

Mr. CHAMBERLAIN said that the additional lining gave the same advantage in both cases, so that it really made no difference. He wanted to find out how to board a car the strongest with the least material.

There was some further discussion, which, however, would be unintelligible without the models or engravings of them.

The PRESIDENT said the time for receiving and answering questions had arrived.

The first question was: How far are the general repairs of cars in use increased by the want of proper inspection, resulting from the want of a proper force for inspecting?

Mr. HILDRUP, who had submitted the question, said that his observation was that repairs were double what they should be if the inspection was properly made. On the train on which he came there, over a first-class road, the inspector ran along, dodged here and there, hit a wheel, and did it so rapidly that no one could be wiser for such an inspection. No one could tell whether the waste was in place and of sufficient quantity, or whether the boxes were full of mud and dust. If waste was valuable, they should see that it was used, that there was oil enough and not too much, that nuts were not loose. He had nothing to say against the inspectors; they did as well as they could; but time enough was not given them. If proper inspection was given, many defects could be seen and remedied.

Mr. GRIFFITH thought he must refer to inspection at way stations, where short stops only were made.

Mr. HILDRUP said that criticism was needed. When receipts fell off companies reduced the working force and the working hours. They relied then on the strength of the material and the honesty of the work. In most cases this was a serious mistake.

Mr. WARD said that the hurry was in consequence of the short time given. On the Pennsylvania road, at Harrisburg, for instance, they had four or five shifts of trains to make from as many tracks, and the shifting and inspection must be done in ten minutes. The inspectors know how to do their work, but could not do it properly in the time given.

Mr. HILDRUP repeated that he was not reflecting on the inspectors, but on the general policy of the roads.

Mr. STEWART said that his practice was to do the best in the time given.

The Committee on the Place of the Next Annual Meeting reported in favor of New York, for the reason that many of the

members would desire to visit the Centennial Exposition at Philadelphia, where it would probably be difficult to find proper hotel accommodations. They could readily be had in New York, and arrangements could easily be made to visit Philadelphia from that city.

On motion, the report was adopted.

The Committee on Communications reported a resolution of thanks for the hospitalities received.

Mr. Smith then offered the following:

Whereas, the practice of entertaining the members of this Association by its friends has become an established custom, and has thus assumed somewhat the character of an obligation to which those who have so generously dispensed hospitality have, in a measure, felt themselves obliged to conform; and whereas, the expenditure of time and money for this purpose has in many cases been very much greater than the members of this Association have the right to expect should be devoted to their enjoyment; and whereas, the expense of such hospitality has in some cases been interpreted as having a significance which has been the cause of embarrassment to members; therefore, we desire, by this resolution, first, to express our thanks for the liberality of our friends in the past, and, secondly, to make the request in this public way, that in the future there shall be no more expenditure of money for the public entertainment of members of this Association.

Mr. VAN HOUTEN said that the resolution required no explanation, but it might be well to say a word. He thought the practice of accepting these entertainments had been detrimental to the Association. It had given rise to the charge that they met only to have a good time. They should first attend to business, and afterwards those who wished to have a good time could do so at their own expense.

Mr. HOPKINS also advocated the adoption of the resolutions. He did not think that any members accepted these hospitalities from improper motives, but there might be such a suspicion.

The preamble and resolution were then unanimously adopted.

The Committee on Subjects for the next meeting reported that by the action of the Association the subjects of Heating, Lighting and Ventilating Cars; the Best Remedy for Hot Journals, etc.; and Draw-bars and Buffers had been continued another year and a committee appointed on a System of Accounts for Car Repair Shops. They recommended that the present committees be continued, or new ones appointed on Best Style and Most Economical Truck for Freight Cars; on the Framing of Cars, and on Car Wheels. Also that a Committee be appointed to report on all improvements made in the Design, Construction or Material used for cars which may be made during the year.

Mr. ADAMS suggested that the committee be instructed to request members to represent their ideas by models as far as possible.

This was accepted and the report, on motion, adopted.

On motion of Mr. HOLMES, it was ordered that a committee be appointed on Elliptic, Combination or other Springs used for Passenger Cars.

The PRESIDENT announced as the Committee on Improvements, Messrs. M. N. Forney, W. D. Hildrup and W. W. Wilcox.

The PRESIDENT said that he had been requested to ask this question: At what time and place was the Master Car Builders' Association organized, and where have the annual meetings been held?

Mr. CHAMBERLAIN said that informal meetings of the Master Car Builders were held in Buffalo, New York, West Albany, Adrian, Mich., and Springfield, Mass., on the 15th of May, 1867. At Springfield, a committee was appointed to draft a constitution and by-laws. The first annual meeting was held in Utica, September 18, 1867; the second at Dayton, O., June 10, 1868; the third at Chicago, June 9, 1869; the fourth at New York, June 8 and 9, 1870; the fifth at Richmond, Va., June 14, 1871; the sixth at St. Louis, June 12 and 13, 1872; the seventh at Boston, June 11, 12 and 13, 1873; the eighth at Cincinnati, June 10, 11 and 12, 1874.

The discussion on the size and framing of cars was then resumed.

Mr. FORNEY referred to the fact that designers of bridges had ascertained that an angle of 45° was the most suitable for braces, and secured the greatest strength. He thought the same principle would hold good for cars.

Mr. HILDRUP objected to cutting the braces when it could possibly be avoided. It was necessary to consider two things, the ability of a car to support its load safely, and its ability to resist concussions and strains when thrown from the track. He thought it made a stronger car to put on the siding lengthwise.

Mr. GRIFFITH thought it was an error in the old method of construction to cut the sills where the bolsters crossed them. He made his end-sills 8 by 8, to give strength in case of a collision.

Mr. KIRBY said he notched the sills and floor timbers about half an inch, just to form a shoulder for the draw-sticks. He put a ¾-inch rod through the dead-woods, running back through the transoms, so that the draft was not altogether on the bolts holding the draw-sticks to the floor timbers. His bolsters were 5¼ by 12 inches. Horizontal boarding let rain into the joints and made trouble where the doors were rabbeted and notched into the corner-posts.

Mr. GRIFFITH said that he let the siding run from the corner posts both ways, meeting at the corners, making an even finish and avoiding liability to split where the rabbet was. In the doorposts he made a rabbet of 1¼ inches, and drove the nails alternately to avoid splitting.

Mr. SNOW said that on the Illinois Central they used iron bolsters altogether. They were of 6 by ¾-inch iron, with an arch of not quite six inches in the center, the draw timbers running through the arch.

Mr. L. GAREY thought that a wooden transom could not be made to carry a center-bearing any length of time, without using at least half as much iron as would be required for an iron one. An iron transom should be welded at the ends.

Mr. CHAMBERLAIN had seen transoms of wood and iron combined constructed in various ways, but he had never seen one that would do its work successfully. One trouble was in getting dry timber. He was now using a double iron transom, the two placed four feet apart over the center-pin. This prevented forward sagging, which was very common since the introduction of the Miller platform.

Mr. LEIGHTON did not disapprove of iron transoms, but thought wooden ones just as good. He used Connecticut white oak, 5¼ inches thick and 15 inches wide; notched out the under side of sills ¼ inch and about the same on the transoms, and bolted them together; run four one-inch rods over the two centers through the intermediates and out through the ends of transom, with nuts on the outside. He had made transoms of wood and iron combined, but they always crowned up, which the wooden ones did not do.

Mr. SNOW had had trouble with double transoms on Pullman cars, but had obviated it by cross trussing.

Mr. HILDRUP thought iron bolsters cost about $13 per car more than wooden ones. He preferred iron to wood, though he did not question the excellent qualities of white oak.

A resolution was adopted instructing the Secretary to express in writing to the Trustees and Faculty of the Stevens Institute of Technology the thanks of the Convention for the invitation to visit the institution and the hospitable reception there. Also the favorable impression received there, and thanks for the valuable assistance received during the last year from members of the Faculty.

It was then resolved that the official report of the Convention, when published in the usual form, shall be offered for sale at a price to be agreed upon.

On motion of Mr. FORD the Committee on the Size and Framing of Cars was continued another year.

The PRESIDENT appointed Messrs. C. A. Smith and Willis Davis as the Committee of Arrangements for the next meeting.

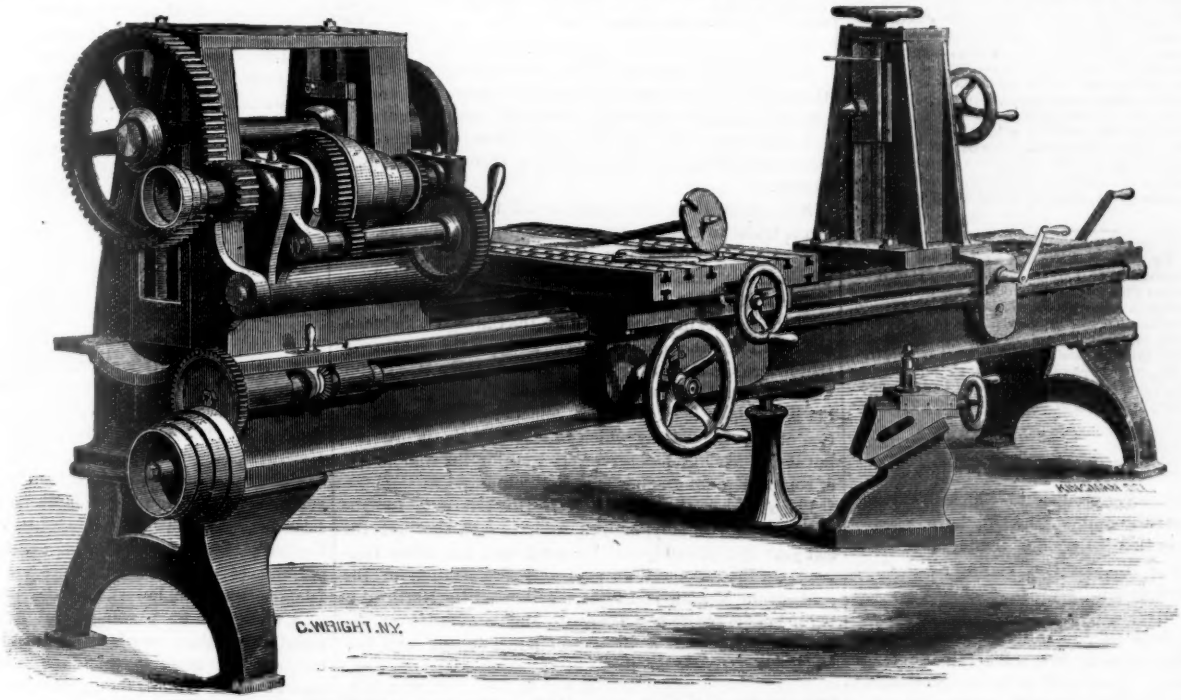
The PRESIDENT then, in pursuance of the resolution authorizing him to designate the members who constitute the Committee on the Dictionary of Terms, announced that that committee consisted of the officers of the Association and Mr. M. N. Forney.

Messrs. B. K. Verbryck, C. E. Garey and D. C. Richardson were appointed the Committee on Car-springs.

The Committee appointed to present the names of officers for the ensuing year, recommended the following gentlemen for the offices named: President, Leander Garey; Vice-President, M. P. Ford; Secretary, C. A. Smith; Treasurer, A. Steinbach.

Messrs. Somerly, Hildrup and W. A. Smith were appointed a committee to cast the vote of the Convention. Messrs. F. D. Adams and Willis Davis were appointed tellers. After balloting the gentlemen named were declared to be unanimously elected to the respective offices to which they were nominated.

On motion, the Association then adjourned, and the Ninth Annual Convention was over.



HORIZONTAL BORING MILL, BY THE PRATT & WHITNEY COMPANY, HARTFORD, CONN.

Horizontal Boring Mill.

The engraving represents a powerful and accurate machine for boring, adapted to swing 42 inches, manufactured by the Pratt & Whitney Company, Hartford, Conn. The spindles of the head and foot stock are of steel, the former being 3¼ inches diameter, and having bearings 7¼ and 6 inches long. These spindles are connected by a shaft running within the beds, which, by means of gearing actuating screws, elevates or depresses them simultaneously. The head has very strong double back-gearing, arranged for turning from ¼ inch to 42 inches diameter. The feed motion may be instantly reversed by means of a clutch and bevel gears. The elevating screw for the foot-stock is provided with a hand-wheel for accurate adjustment of the spindles, and gearing, covered with an apron, for moving it along the bed. The table for reception of work is 48 inches long by 20 inches wide. It has four changes of feed. The countershaft is designed for two speeds—50 and 110 revolutions per minute. Four sizes are made, the length of bed varying from 10 to 16 feet, the greatest distance between centers from 5 ft. 7 in. to 11 ft. 5 in., and the weight from 7,100 to 8,200 lbs.

If the lathe should be wanted for turning as well as boring, a tool-rest and face-plate will be furnished.

Prize for a Car-Coupling.

The Executive of the German Railroad Union makes the following announcement, which we translate from the official publication:

At the general convention at Frankfort-on-Main, on January 22, 1873, the German Railroad Union resolved that prizes be offered for the invention of an apparatus by means of which the coupling of railroad cars can be effected without requiring the person making the coupling to go between the cars; namely, a first prize of 9,000 marks ($2,187 gold); and a second prize of 3,000 marks ($729 gold).

None of the apparatus submitted in consequence of the foregoing offer of prizes since June 25, 1873, could receive a prize, since none of the 41 constructions submitted to the decision of the examination committee answered the requirements stated in regard to simplicity and durability of construction, easy and safe operation on either side in any position of the car by day and by night, likewise in respect to harmony with the now prevailing coupling system, and finally, also in respect to cheapness of construction and maintenance; and moreover, none of the aforesaid constructions exhibited advantages so eminent as to justify the awarding of a premium in spite of some defects.

Thereupon the Premium Committee has resolved to admit new apparatus to competition for the prizes, to fulfil the following requirements:

1. The apparatus must be so explained by descriptions, drawings, models, etc., that an accurate judgment can be made concerning its operation, its applicability, and its effectiveness. They are to be sent free, by the 1st of March, 1876, to the under signed Executive of the Union (Berlin, Askanischer Platz, No. 5.

2. Only those inventions will be admitted to competition which have been into use before this notice on a railroad belonging to the German Railroad Union. The application for the award of the prize must be made and supported by a railroad management belonging to the Union.

3. The examination of the competing offers, and the decision as to whether the prizes shall be awarded, and if so to which competitors, will be made by the Examining Committee, consisting of 12 members, appointed by the German Railroad Union.

4. The receiving of a prize does not excluded the patenting of the invention and the employment of the patent for the benefit of the inventor.

THE EXECUTIVE DIRECTION OF THE GERMAN RAILROAD UNION.
BERLIN, April 22, 1875. FOURNIER.

The English Brake Trial.

In reporting this trial, the London *Times* concluded as follows: "The general impression produced by the trials on those who witnessed them seemed to be that the Westinghouse automatic brake was the most efficient of the competitors; that it acted in less time and reduced the speed more quickly than any other. The experiments failed to bring out one point of great importance—namely, how soon the pressure of the blocks could be brought to bear upon the wheels and how soon the wheels could be released from them, but in this respect the same brake seemed to have a great advantage over others. * * * The trials have at least afforded to the Royal Commissioners, the railway managers, and to the public conclusive evidence of what continuous brakes will do, and for the future we shall know what to think about so-called accidents in which damage or loss is permitted to occur at a distance of more than 400 yards from the first discovery of danger."

Rewards for the Train Robbers.

The Brotherhood of Locomotive Engineers have offered a reward of $500 for the arrest of the murderer or murderers of Milo Eames, and the employes of the Vandalia road an additional $500, making a total reward for their capture of $3,450.

A Question in Train Dispatching.

A correspondent writes: "It seems to me that if a train is to be held at any particular station for another train, the train to be held should by all means be *first notified*, and not until then should the other train be allowed to approach the first. This way of waiting until the last chance and then depending upon a green flag is 'pretty thin,' especially where so much is at stake."

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S. WRIGHT DUNNING AND M. N. FORNEY.

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Editorial Announcements.

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE CHICAGO RAILROADS.

The railroads which carry produce to Chicago, extending northward, westward and southward, have a somewhat similar traffic, in that their chief traffic eastward is agricultural produce of one kind or another, and their chief traffic westward lumber and merchandise for the farmers' use. Still there are wide differences in the nature and the bulk of the traffic of the different roads; and in the comparisons which we make below the extent and the nature of these differences may well be the most valuable lesson to be learned. Unfortunately the returns from the different lines come in for different fiscal years, and at widely separated periods. All of them have now closed a fiscal year since 1874, but the company with the largest mileage has not yet reported and probably will not until near October, when the reports for the calendar year 1874 will be already old. On this account we prefer not to delay the comparison until that time, but rather make it now, using the Northwestern's report for 1873–74 when referring to it, but confining our attention chiefly to the railroads south of its lines, from the Chicago, Burlington and Quincy to the Illinois Central inclusive, which occupy the southwestern quadrant about Chicago. On this account, also, we will not have much to say of the Chicago, Milwaukee & St. Paul, which has but recently become a Chicago road, and still has its terminus at Milwaukee, thus differing from all the other roads named, which have no other lake terminus than Chicago.

There will be the less to regret in this omission, because the lines of the northwestern quadrant from Chicago form in many respects a separate class, distinct in traffic and in other circumstances from those further south. If, however, it was possible to treat in detail the separate lines of the different companies, we would include in this southwestern quadrant the Chicago & Omaha line of the Northwestern, 490 miles of railroad extending nearly due west from Chicago, whose traffic staples are more like those of the southern than those of the northwestern lines.

These northern lines, including all north of the parallel of Chicago, that is, all of the Chicago, Milwaukee & Paul system except a little of the Western Union Railroad, and all of the Chicago & Northwestern except this 490 miles from Chicago to Omaha, are essentially wheat-carriers, as we have often said. Nearly everywhere on these lines where there is any agriculture, the country produces the corn, oats, cattle and hogs for its own consumption, but it exports comparatively little of the latter products, and ships immense quantities of wheat, frequently sending to Chicago nearly as much as all other railroads together, and to Milwaukee as much as the total Chicago receipts. They have, too, on their more northerly lines, a lumber traffic directly from the mills, which none of the southern lines have, and the Northwestern has one line with an immense iron ore traffic. Moreover, except Iowa, they have no coal mines on their lines, as all the southern lines have, so that there is reason for making such a division between the railroads which carry produce to Chicago.

The northern group until recently was the system of a single company, the Chicago & Northwestern, which had and has three distinct lines entering Chicago, one from the north, one from the northwest, and one from the west. Within three years the Chicago, Milwaukee & St. Paul has sent down its connection from the north, and the Chicago & Pacific has but just completed a line a little north of west for 88 miles.

The lines of this northwestern quadrant are:

	Miles.
Chicago & Northwestern	1,973
Chicago, Milwaukee & St. Paul	1,399
Total	3,372

To these must be added the Chicago & Pacific, but recently completed to the Rock River at Byron, and too new to have a record. We may offset it by the Chicago, Danville & Vincennes in the southwestern quadrant.

The group which we shall consider more particularly includes the following lines, having by their last reports the mileage given:

	Miles.
Chicago, Burlington & Quincy	1,264
Chicago, Rock Island & Pacific	974
Chicago & Alton	649
Illinois Central	1,107
Total	3,994

The Chicago, Danville & Vincennes belongs properly to this division; but it has published no reports that are full enough to make comparisons profitable, and, moreover, it is a short road with very few connections, and more important to Chicago as a coal-carrier than as a produce-carrier.

Neither of these lists contains all the mileage which sends traffic to Chicago from the respective quarters. In the southwest, especially, there are several lines not distant from Chicago which serve largely or chiefly as feeders to Chicago railroads—such as the Chicago & Iowa, the Chicago, Pekin & Southwestern, the Chicago & Paducah, etc.; while to the northwest, as well as the southwest, there are many railroads west of the Mississippi which send a large part of their traffic to Chicago. This list is, then, quite imperfect, if considered as an enumeration of the channels by which Chicago traffic is carried; but it will nevertheless serve very well for the comparison of companies and systems with each other.

The report of the Chicago & Northwestern is for the year ending with May, and, as we have said, that for the last year will probably not be published for some time yet. On that account we give very few figures for the roads of the Northwestern quarter, those of the Northwestern being for the year ending with May, and those of the Chicago, Milwaukee & St. Paul for that ending with December, 1874.

	C. & N. W.	C., M. & St. P.
Mileage worked	1,960	1,399
Stock per mile	$22,782	$19,781
Bonds per mile	27,546	18,299
Stock and bonds per mile	50,208	38,080
Earnings per mile	8,091	6,400
Expenses per mile	5,825	4,197
Percentage of expenses	71.97	66.0
Net earnings per mile	$2,266	$2,203
Receipt—		
Per passenger mile	3.14 cts.	3.35 cts.
Per ton mile	2.22 "	2.38 "
Expense—		
Per passenger mile	2.26	2.21
Per ton mile	1.60	1.57
Traffic per mile of road—		
Passenger-miles	74,750	41,644
Ton-miles	317,405	185,250

These two roads are competitors for a large part of their traffic. In the reports of the amount of traffic what are called the "proprietary roads" of the Chicago & Northwestern, most of which are unprofitable, are not included. This will account partly for the much greater average bulk of traffic on the Northwestern's lines, as shown in the figures for passenger-miles and ton-miles per mile of road; though the St. Paul has no lines with traffic so heavy as that of much of the Northwestern's roads in Illinois.

With regard to the prices received for work and the cost of doing it, there is wonderfully little difference.

The companies of the southwestern quadrant, with the exception of the Chicago, Rock Island & Pacific, whose fiscal year ends with March, report for the calendar year, and our figures in all cases are from the reports for the year last past.

First, we report as to their capital accounts:

	C. B. & Q.	C., R. I. & P.	C. & A.	Ill. Cen.
Mileage worked	1,234	974	649	1,107
Stock per mile	$21,078	$39,829	$34,342	$41,018
Bonds per mile	21,666	14,338	20,052	7,072
Stock and bonds per mile	$42,744	54,167	54,394	48,090

We confess that this statement is apt to be misleading. All of these companies work a considerable mileage which they do not own; and though we have divided the amount of stock and debts by the mileage owned, this does not cover the case, for in almost every case the companies have large proprietary rights in the leased lines, gained by expenditures upon improvements, etc. How far this may affect the capital account is seen by the last Chicago & Alton report, which gives the total amount of stock and bonds per mile, after deducting the expenditures actually made on property not directly attached to the mileage earned by the company, as only $40,878 per mile—nearly a quarter less than shown above. However, as the figures stand, the showing is a very good one, all the roads being very good ones, with heavy equipment, abundant sidings, much steel in the tracks, and three of them with a considerable mileage of double track. Only one, it is seen, has a funded debt greater than its share capital, and this one's debt is a very light burden, the interest on which is less than two-fifths of the road's net earnings.

As regards traffic, we have the following figures:

	C., B. & Q.	C., R. I. & P.	C. & A.	Ill. Cen.
Train mileage—				
Passenger	8,127,817	1,020,010	1,190,588	1,383,895
Freight		3,540,287	1,958,455	2,929,510
Carried one mile—				
Passengers	85,356,325	54,804,212	.....	51,115,268
Tons of freight	445,686,220	287,913,578	.....	273,559,253
Per mile of road—				
Passengers	67,529	81,163	.....	46,174
Tons	352,600	427,171	.....	247,117

For the mileage covered by the reports, the statements of passengers carried one mile and tons of freight carried one mile *per mile of road*, as shown in the last two lines, is a perfect comparison of the bulks of traffic. The figures for the Chicago & Alton are wanting unfortunately, the report making no statement of passenger and tonnage mileage. The Rock Island road, it appears, having 20 per cent. more freight and 21 per cent. more freight than the Chicago, Burlington & Quincy. Doubtless if the traffic of the Rock Island's leased line, the Chicago & Southwestern, were included in the report of its traffic, its average would be considerably reduced.

Now as to earnings and expenses per mile and per unit of traffic, we find the following:

	C., B. & A.	C., R. I. & P.	C. & A.	Ill. Cen.
Per mile of road—				
Earnings	$9,213	$10,954	$7,897	$7,175
Expenses	5,159	5,717	4,470	3,638
Net earnings	4,054	5,237	3,427	3,537
Per passenger-mile—				
Earnings	3.009 cts.	3.061 cts.	....	3.285 cts.
Expenses	1.685 "	1.598 "	....	1.665 "
Profit	1.324 "	1.463 "	....	1.620 "
Per ton-mile—				
Earnings	1.900 "	1.920 "	....	2.080 "
Expenses	1.044 "	1.002 "	....	1.055 "
Profit	0.836 "	0.918 "	....	1.025 "
Prop't'n of exp'nses	55.93 p. c.	52.19 p. c.	56.60 p. c.	50.70 p.c.

Here we see earnings and expenses varying considerably, the highest being one-half greater than the lowest, but in receipts and expenses per ton per mile there is very little difference. The Chicago, Burlington & Quincy had the lowest passenger rate, but that of the Illinois Central, the highest, was but 9 per cent. higher; so the Burlington road had the lowest freight rate, but the Rock Island's was but 1 per cent., and the Illinois Central's but 8 per cent. higher. In expenses per unit of traffic the differences are still less; the Rock Island's were the lowest, but the highest were but 5 per cent. more both on passenger and freight expenses. The variations in the percentages of working expenses, therefore, are due more to the differences in rates received than to the cost of doing the work, and the three roads reporting average receipts per unit of traffic have had extraordinary uniformity in the cost of doing the same amount of work.

There are many other comparisons of this kind which it would be interesting to make, but this must do for the present.

The Growth of City Population.

A study of the census will be of advantage to most business men who have occasion to make preparation for the supply of a probable future demand, among whom may be counted railroad men, who, in this country at least, have to provide for a growing business, and, in so doing, must assume to some extent what will be the character as well as the amount of that future increase of business. For such calculations the magnificent Statistical Atlas of Gen. F. A. Walker, the Superintendent of the last Census, offers great facilities. One point which we have frequently referred to heretofore we find developed in an article by General Walker, in the August number of *Harper's Monthly*. This is the great difference in the rates of growth of the city and the country population. General Walker gives the following little table, which sets this forth in a striking way:

Year.	Population of United States.	Population of Cities.	Percentage of City Population.
1790	3,929,214	131,472	3.4
1810	7,239,881	356,920	4.9
1830	12,866,020	864,509	6.7
1850	23,191,876	2,897,586	12.5
1870	38,558,371*	8,071,875	20.9

These census returns show that in 1850 less that 3,000,000 people, or one-eighth of the entire population of the United States, lived in cities. In 1870, the number had increased to more than 8,000,000, and the proportion to 21 per cent.

The rate of increase in town and country for each period of 20 years, as given in the table above, is:

	Country.	City.
1790 to 1810	81 per cent.	172 per cent.
1810 to 1830	74 "	142 "
1830 to 1850	69 "	235 "
1850 to 1870	50 "	178 "

Only about one-fifteenth of the total increase during the first twenty years was in the cities, but in the last twenty years a third of it was in the town population.

Most of us, even if we are still young, formed our early and lasting impressions of the character of the country when it was essentially a rural community, in which the town population and the manufacturing population were an almost insignificant fraction. Now, nearly a quarter of the whole population is in towns, and the chief growth is there. And in our calculations for the future it is the growth rather than the existing population which we must plan for. Just now it is a population three-fourths rural which is to be provided for; but if in our preparations for satisfying the requirements of future years we count on a similar division we shall certainly make an error. Should city and country populations increase at the same rate from 1870 to 1890 as they did from 1850 to 1870, there will be in the latest year named 22,000,000 people in our cities and about 45,000,000 in the country, and the increase will have been about as great in the former as in the latter. It is not probable that either will grow so rapidly, but the tendency is rather for an increase than a decrease in the proportion of city growth.

This change is a natural one and should have been expected, but seems not to have been, at least not generally. The early growth of the country was chiefly of farmers, because the advantage which this country had to offer over older ones was an abundance of cheap, fertile land, while a great town population and industry was prevented by a lack of capital. Now the area of uncultivated fertile lands within the borders of the United States remains very great, but there is comparatively little left which is cheap (as we have counted cheapness) and accessible to markets. The great temptations to make farms of uncultivated lands have in a measure ceased—that is, are not so strong as they used to be—and the consequence is that a much larger proportion than formerly of the increase of population is diverted to other industries—chiefly manufacturing. This tendency is helped by the accumulation of wealth, which makes the community great buyers of goods and enables it to supply the capital needed for the establishment of manufacturing industries.

Of the fact, whatever its cause, there can be no doubt, and the important thing for railroad projectors and managers, as well as for many other business men, is to hold the fact constantly in mind that they may make their preparations to do the kind of work that will be demanded of them and not that only which was long the chief one in demand, or is so now.

The California Grain Traffic.

The movement of California grain and flour for the crop year ending with June has been:

San Francisco receipts:

	1874-75.	1873-74.	Inc. or Dec.	P. c.
Flour, bbls	457,292	472,108	Dec. 14,816	3.1
Wheat, bush	16,493,907	13,596,975	Inc. 2,893,950	21.3
Barley, bush	2,044,617	1,858,220	Inc. 186,397	10.3

In California barley takes the place of corn and oats to a great extent, the latter grains not thriving there. Of oats 270,000 "sacks" and of corn 106,000 "sacks" are reported in the receipts.

The exports are wholly of grain and flour. Considerable barley was shipped last year across the plains by rail, but little or none by sea.

The exports of wheat and flour were:

	1874-75.	1873-74.	Inc. or Dec.	P. c.
Flour, bbls	437,800	639,900	Dec. 172,100	27.0
Wheat, bush	14,632,833	12,130,000	Inc. 2,492,833	20.7
Total*	16,961,833	15,329,500	Inc. 1,632,333	10.7

* Flour reduced to wheat at the rate of five bushels per barrel.

The exports in 1872-73 were 17,723,571 bushels, thus exceeding a little those of last year even.

These enormous exports, it must be remembered, are from a single State with a population not more than one-fourth as great as that of Illinois or half that of Iowa. They were about as great as those of all the rest of the United States last year. This great export movement is due not so much to the extraordinary production of California, though its production is extraordinary, as to the lack of a home demand. Probably less than four million bushels will supply the California population, and the State is so situated that it cannot compete for the supply of the other United States, with the exception of Nevada. On the other hand, Illinois must consume some sixteen millions of bushels within its own borders.

According to current estimates of this season's crop in California, it will have no more than 12,000,000 bushels for export, which is five millions less than last year, and three millions less than the year previous, and the other producing districts of the United States will have to make up this deficiency.

The effect on railroad freights in California will be greatest in the San Joaquin Valley line of the Central Pacific, but will also be considerable on its lines in the Sacramento valley. The latter, however, have other important traffic.

The exports of wheat from California, with inconsiderable exceptions, are made to Europe; but with flour it is different. Of last year's exports about 40 per cent. went to Great Britain and the rest to Pacific ports, and nearly one-third of the whole to China, whose progress in cultivating a taste for wheat bread is of great importance to our Pacific coast. The amount of exports at present is hardly more than enough for the European population in China, however. No shipments to British India are specified; it probably can be supplied more cheaply from Australia.

The California wheat movement, as indicated by San Francisco receipts, first reached as great an amount as a million bushels in 1859-60. The year following the exports were 3,500,000 bushels, but this amount was not equaled again until 1866-67, when it reached 8,500,000 bushels. Thence till 1871-72 the exports did not vary more than 1,500,000 bushels from that amount; but in the year named they were less than 3,800,000 bushels. From that they jumped to 17,700,000 the next year—the greatest exports the State has made as yet. The crop is more precarious there than in any other great wheat-growing district of the United States; but it is produced with wonderfully little labor, and when the season is favorable the State becomes the most formidable of all competitors with the upper Mississippi valley for the supply of the European demand. This year it has sent to Great Britain more than Russia, and, if we are not mistaken, as much as or more than all the rest of the United States.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new lines as follows:

Woodstock.—The first track is laid, from White River Junction, Vt., southwestward 3 miles.

Montpelier & Barre.—Completed from Montpelier southeastward 6 miles to Barre, Vt.

McKean & Buffalo.—Completed from a junction with the Buffalo, New York & Philadelphia Railroad at Larrabee, Pa., southeastward 22 miles to the mines of the Buffalo Coal Company at Clermont, Pa.

This is a total of 37 miles of new road, making 457 miles completed in the United States in 1875, against 727 miles reported for the same period in 1874, and 1,578 miles in 1873.

Correction.

In describing the engine truck wheel used on the Baltimore & Ohio Railroad, in last week's *Railroad Gazette*, we stated that the road named was equipped with nearly 400 engines. It should have been 550 engines, about thirty of which are provided with cast-iron and the rest with steel tires. Only two of the latter and one of the former were broken during the last winter. Both the steel and the cast-iron tires are put on with a "tapered fit" and fastened with bolts, as shown in the illustration we published. This record during the very severe weather of last winter is very strong testimony in favor of this method of putting on tires.

OCEAN TRAFFIC seems to have fallen off largely of late years, or else the supply of vessels was much greater than the demand a few years ago. The New York *Bulletin* has compiled a table of the number and tonnage of the vessels registered under each national flag at the close of 1870 and 1874. This shows that the number decreased in the four years from 59,918 to 57,289, and the tonnage from 16,042,498 to 14,523,630, the falling off in tonnage being nearly 10 per cent. Of the total tonnage, Great Britain had 44 per cent. in 1870, and 37 per cent. in 1874; the United States 15 per cent. in 1870, and 15 per cent. also in 1874. The changes in the relative proportions of tonnage under each flag since 1870, for those nations that had so much as 5 per cent. of the total either year, were: England, a decrease from 44 per cent to 37; the United States, from 15 to 15; Germany, from 6½ to 5.9; Norway, an increase from 6.2 to 9.3; Italy, an increase from 5.7 to 8.4; France, a decrease from 5.6 to 5.1. These figures include only sea-going vessels, and not coasters, of which the United States, with its coast line exceeding that of any other country, has more than any other nation. Moreover, our great lakes give place for an internal marine greater than our ocean tonnage.

THE CROP PROSPECT, so far as the United States are concerned, is extremely good. Winter wheat will be a short crop, but spring wheat seems to be abundant everywhere, the area sown being great and the yield per acre promising to be large. Such reports come from all the great wheat-growing districts of the Northwest, Wisconsin and Minnesota leading, but the other States also reporting better prospects than for almost any previous year. The border States and even Dakota promise to have millions of bushels for export; and if Europe had a crop like last year's, in spite of the deficiency in California, it would be hard to say what could be done with all the wheat. Fortunately for this country, however, the crop of Europe is short, and the effect of this has already been felt on prices. Should these prices be maintained, it is possible that the wheat movement of the country may equal or exceed that of 1873-74 even, and and stimulate traffic immensely. But the corn crop, which is even more important than the wheat crop in this country, is also unusually promising. The Agricultural Department reports a much larger acreage than last year, and a much better average condition. There is time enough yet, to be sure, for injury to this crop, but if the present promise is fulfilled, it will make unusual demands on the carriers: and altogether the prospect of an unusually large crop and good prices tends to stimulate business generally, as the reality of them will be sure to do.

Letting Contracts to Favorites.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Thanks for your pungent editorial in last week's issue of the *Gazette*, on "Unfair Contracts," A few more of the same sort will doubtless have a good effect in directing attention to an injustice that ramifies through the contract system to a greater extent than is ordinarily supposed. Experience tends to show that men's acts are more governed through fear of consequences than from any abstract ideas of right and wrong, particularly where values are concerned; and while this observation does not give one a very exalted view of human nature, nevertheless, there is sufficient truth in it to weigh in commercial and other transactions. Since you have pointedly illustrated your views by reference to a very common practice in "bridge lettings," I would suggest that, in view of the fact that it is not to the interest of that order of the business community to run down prices to a bare percentage of profit, or even worse, the builders combine for their mutual protection—not in the sense of making a "ring:" that would be impossible, no matter how desirable; but where bridge-builders suspect that tenders are simply invited by a railway company for the purpose of fixing a price for a selected favorite, to decline spending days or weeks in preparing plans and estimates, and notify the said favorite, inasmuch as they will not compete under the circumstances, not to hesitate in putting in a good round price for the work. A contractor can hardly be blamed for taking advantage of "interior relations," nor can a railway officer be censured for having preferences for certain parties to do their work (excepting of course when such officers derive pecuniary benefit in administering a trust for which they receive direct compensation from the owners). No one has any any objection to a railroad company's making a contract with a party to do a certain piece of work; that is their privilege, and is a matter of bargain between the two parties. If the officers of such a company pay too much for their work, it is a matter between them and their stockholders. But if, to obtain the lowest possible price through the form of competition, the time, brains and money of other men are simply made use of as a basis of trade with a previously elected contractor then, as you say, they are as morally reprehensible as if they stole the money, the equivalent of time and expense of the duped competitors for the work. This evil is becoming so notorious that it can have but one result, and that is, no respectable contractor will consent to compete for work unless all tenders for work be publicly opened and read before the bidders, and none received beyond a certain specified time. Where a railroad company receives, opens and awards tenders for its work secretly, such road lays itself open to the suspicion of unfair practices, and is ever after looked upon with distrust by those whom it may thereafter invite to make other estimates.

There are some roads, not a hundred miles from New York, that somehow or other have always the same parties to do their work, despite the forms of competition that they always go through with whenever an important piece of work is to be let. Those roads, it may be remarked, receive their bids secretly, that is, they invite tenders, but that is the last heard of them. Each party tendering knows his *own* price and that all. He never knows even what the work is actually awarded at. One road, however, the Erie, has had many important public lettings during the past three years, and the result is that all along that road may be seen the work of different men. It has been the practice on that road, at least in the engineer department, *since* the Gould administration, to invite tenders from trusted parties, which tenders were opened at a fixed time and place, the parties tendering being invited to be present. In the matter of bridges alone the Erie Company has specimens of work from almost every prominent bridge-builder east of the Alleghanies—which, by the way, suggests the idea that the Erie road, for that reason, is probably the best road in America for the student of engineering to study the practice of modern bridge-building. In this respect, the other roads converging at New York are inferior to the Erie, as they represent in the main but one idea, and show a surprising uniformity in the designs of their bridges; although they *apparently* make great efforts to have specimens from other builders, they have thus far been unsuccessful. These roads let their work "privately."

Now there is very little use of making a crusade on purely moral grounds. Such a course would waste valuable time, and be as effective as was Canute's command to the sea to be still. Reforms of such evils as the one under discussion can best be carried out through the principle of self-interest, a principle that at once arrests men's attention, and one peculiarly applicable in this case. You have kept your journal so free from bias and so pure from any commercial consideration in your editorial page, that a few sledge-hammer blows in the cause of fair dealing as a *paying* system will no doubt attract the thoughtful consideration of our railway managers, and, paraphrasing Cicero's three cardinal requisites for the orator, I urge you in conclusion—agitate! agitate! agitate!

PONS.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Louisville, New Albany & St. Louis.—Col. Horace Scott, President of the company, has been appointed Receiver.

Boston & Lowell.—The Boston *Advertiser* says: "Mr. Hocum Hosford, the newly elected manager of the Boston & Lowell and Lowell & Nashua roads, has been associated with the corporation as director for nine years, and is perfectly familiar with the general management. Mr. Hosford intends to enter upon the discharge of his duties on the 1st of August, and in so doing he will retire from the immediate control and management of his business in Lowell, retaining, however, his position as President of the Merchants' National Bank, and the directorship in several corporations. Mr. Winslow will continue to act in the capacity of advisory manager for another year, while Mr. Parker will remain, as heretofore, Superintendent of the road."

Central Vermont.—The Smith board of directors has chosen Mr. D. D. Ranlett, Treasurer, in place of H. C. Lockwood, resigned.

Portsmouth, Great Falls & Conway.—At the annual meeting in Portsmouth, N. H., July 13, the following directors were chosen: Ichabod Goodwin, W. H. Y. Hackett, Portsmouth, N. H.; G. W. Burleigh, Great Falls, N. H.; John Wooldredge, Lynn, Mass.; F. Gordon Dexter, Boston. The board re-elected John Wooldredge, President, and Wm. H. Y. Hackett, Clerk. The road is leased to the Eastern.

Eastern, of New Hampshire.—At the annual meeting in Portsmouth, N. H., July 13, the following directors were chosen: Ichabod Goodwin, Wm. H. Y. Hackett, Portsmouth, N. H.;

F. W. Choate, Beverley, Mass; John Wooldredge, Lynn, Mass.; Robert W. Hooper, Boston. The board re-elected Ichabod Goodwin, President, and Wm. H. Y. Hackett, Clerk. The road is leased by the Eastern of Massachusetts.

Rochester & State Line.—The following officers have been elected for the ensuing year: M. F. Reynolds, President; Oliver Allen, Vice-President; D. McNaughton, Secretary and Treasurer; Edward Harris, Attorney; C. S. Masten, Chief Engineer. Executive Committee—Thomas Leighton, M. F. Reynolds, William Bristol, D. D. S. Brown, George E. Mumford. Finance Committee—E. F. Smith, Edward Harris, Oliver Allen.

Wilmington & Western.—Mr. John C. Farra has been appointed Secretary and Treasurer, in place of F. R. De Vou, resigned. The change will take effect August 1.

Belfast & Moosehead Lake.—C. B. Hazeltine has been re-elected President and J. H. Quimby, Clerk, for the ensuing year. The road is leased to the Maine Central.

Blue Line.—Mr. John B. Corson has been appointed General Manager in place of Mr. Thomas Hoops. All communications respecting the business of the line should be addressed to Mr. Corson, at Niagara Falls, N. Y.

Missouri, Kansas & Texas.—Mr. H. H. Courtright, late of the Hannibal & St. Joseph, has been appointed General Freight Agent in place of W. B. Robinson. Mr. G. W. Cushing, late of the Toledo, Wabash & Western, and formerly of the Northern Pacific, has been appointed Master Mechanic.

Franklin Telegraph.—At the adjourned annual meeting in Boston, July 15, F. L. Ames, E. T. Atkins, Sidney Dillon, Thos. T. Eckert, Henry M. Faber, Jay Gould, W. J. Lyons, John H. Mortimer and E. H. Rollins were chosen directors. James G. Harris was re-elected Clerk, and Alfred Nelson was chosen Treasurer. The successful ticket was supported by the New York party among the stockholders.

Hoosac Tunnel Fast Freight Line.—Mr. Stephen D. Caldwell, Western Manager of the White Line, has been appointed General Manager of this line, with headquarters at Rochester, N. Y.

Atlantic & Pacific.—The new board has re-elected Andrew Pierce, President, and D. R. Garrison, Vice-President.

Burlington, Cedar Rapids & Minnesota.—The United States District Court has appointed Gen. E. F. Winslow, Receiver. General Winslow is well known as a railroad man and a railroad builder, and is President of the St. Louis & Southeastern Company.

Chicago, Burlington & Quincy.—Mr. W. A. Chatterton has been appointed Train Master at Ottumwa, Ia., in place of Mr. J. C. Lee, who has gone to the Michigan Central.

Saginaw Valley & St. Louis.—At the annual meeting in East Saginaw, Mich., July 14, the following directors were elected: D. H. Jerome, Amasa Rust, James Hay, George F. Williams, L. H. Eastman, John L. Evans, Joseph E. Shaw, A. W. Wright, Timothy Jerome, Geo. Jerome, N. Barnard, Benton Hanchett, Ezra Rust.

Des Moines, Indianola & Missouri.—At the annual meeting in Des Moines, Ia., recently, the following directors were chosen: B. F. Allen, H. F. Royce, A. Kimball, E. R. Clapp, B. F. Roberts, Chas. Stuart, Thos. S. Wright. The board subsequently met and elected the following officers: B. F. Allen, President; H. F. Royce, Vice-President; E. R. Clapp, Treasurer; Thos. S. Wright, Secretary; B. F. Allen, H. F. Royce, A. Kimball, Executive Committee. The road is leased to the Chicago, Rock Island & Pacific.

St. Louis, Kansas City & Northern.—Mr. S. P. Brown has been appointed Commercial Agent at Kansas City. He continues, as formerly, to have charge of the Kansas City station, with Mr. J. E. Harris as assistant. The latter position he has held for three years past; before that for eight years Mr. Brown was agent at different stations on the Chicago & Alton Railroad—the last one being Joliet.

Hot Springs Branch.—Jo Reynolds, well known on the Upper Mississippi as the proprietor of the "Diamond Jo" line of steamboats, is President of this company.

Erie.—The new board of directors has re-elected Hugh J. Jewett, President; W. P. Shearman, Treasurer; A. R. Macdonough, Secretary.

Marquette, Houghton & Ontonagon.—At the annual meeting in Marquette, Mich., July 15, the following directors were chosen: Samuel Schoch, Marquette, Mich.; Charles H. Palmer, Pontiac, Mich.; S. L. Smith, Lansing, Mich.; George Jerome, Detroit, Mich.; Charles Francis Adams, J. J. Higginson, Boston; Samuel Sloan, Moses Taylor, John Jacob Astor, John Steward, E. F. Hatfield, Jr., New York. The board re-elected Samuel Sloan President; E. F. Hatfield, Jr., Secretary and Treasurer; Samuel Schoch, General Manager.

National Telegraph.—This new company has been organized in San Francisco by the election of the following directors: Faxon D. Atherton, Wm. Burling, Alfred A. Cohen, James B. Keene, Calvin W. Kellogg, Michael Reese, Wm. Sharon.

Raleigh & Gaston.—At the annual meeting in Raleigh, N. C., recently, Dr. W. J. Hawkins was re-elected President, with the following directors: Joseph B. Batchelor, George Little, Walter Clark, Raleigh, N. C.; Paul C. Cameron, Hillsboro, N. C.; George W. Grice, Portsmouth, Va.; W. W. Chamberlain, Norfolk, Va. The board re-elected W. W. Vass, Treasurer, and A. B. Andrews, Superintendent.

Connecticut Railroad Commission.—The Connecticut Senate has confirmed the Governor's nomination of Mr. Minott A. Osborn to be a member of the Board of Railroad Commissioners.

New England Railway Passenger Conductors' Benevolent Association.—Mr. H. E. Paine, of the Old Colony Railroad, has been chosen President, and James B. Colby, of the Concord Railroad, Vice-President.

TRAFFIC AND EARNINGS.

Flour and Grain Movement.

Receipts and shipments for the week ending July 10, flour in barrels and grain in bushels, are reported as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Flour:				
Lake ports' receipts.....	78,370	90,482	Dec.. 12,112	13.4
" " shipments....	94,921	89,495	Inc.. 5,426	6.0
Atlantic ports' receipts..	160,566	153,998	Inc.. 6,568	4.2
Wheat:				
Lake ports' receipts.....	1,273,634	1,605,209	Dec.. 331,575	20.7
" " shipments....	1,862,494	798,598	Inc.. 1,063,896	133.2
Atlantic ports' receipts...	1,568,985	1,846,841	Dec.. 277,856	15.0
Grain of all kinds.				
Lake ports' receipts.....	2,267,306	3,825,497	Dec.. 1,558,191	41.0
" " shipments....	2,939,833	3,380,618	Dec.. 440,785	13.0
Atlantic ports' receipts...	2,805,086	4,351,626	Dec.. 1,546,540	35.6

The noticeable feature in the above is the immense increase of Northwestern wheat shipments, prompted by the material rise in prices. These shipments, however, are compared with light ones in 1874, and do not after all bring up the total grain shipments to equality with those of that year. This is owing to the great decrease in corn movement. There was an extraordinary movement in corn last summer, reaching 2,200,000 bushels for the week under consideration, which was two-thirds of the total grain shipments. This year wheat is nearly two-thirds. Of the total shipments of grain from lake ports for the week, 26.7 per cent. went by rail this year, 42 per cent. last year, and 24.4 per cent in 1873. The rail shipments this year were about a quarter less than for the previous week. It should be remembered that a revival of the export demand is more likely to stimulate water than rail shipments, which latter have always been chiefly for home consumption.

At Buffalo shipments for the same week, 34 per cent. went by rail. The total was a third less than last year.

For the week ending July 17, the receipts at Chicago were:

	1875.	1874.	Inc. or Dec.	P.c.
Flour, bbls.....	38,551	24,729	13,822	56.0
Grain, bush.....	1,496,475	1,773,883	277,408	15,7

and the shipments were:

	1875.	1874.	Decrease.	P.c.
Flour, bbls.....	32,085	33,898	1,813	5.3
Grain, bush.....	1,861,310	2,269,194	407,884	18.0

Thus, notwithstanding the great increase in movement lately, the receipts and shipments remain lower than last year. This is owing to the falling off in corn, of which there is very little left in the country. The receipts of wheat were nearly twice as great and the shipments more than three times as great as for the corresponding week last year.

Petroleum Movement.

Receipts of crude at Pittsburgh from Jan. 1 to July 10 were 512,884 barrels this year, against 1,008,556 in 1874. Shipments of refined by the Pennsylvania, the Pittsburgh, Washington & Baltimore and the Alleghany Valley railroads, were 289,376 barrels this year, and 490,580 in 1874. Both receipts and shipments are the lightest for five years.

Petroleum exports from the four principal exporting cities of the United States, from Jan. 1 to July 12, were 102,035,939 gallons in 1875, against 116,697,884 in 1874, a decrease of 12¼ per cent. All ports show a decrease except Baltimore, which shipped six times as much as last year.

Railroad Earnings.

Earnings have been reported by the following companies:

	1874-75.	1873-74.	Inc. or Dec.	P. c.
Year ending May 31:				
Raleigh & Gaston.....	$261,142	$274,803	Dec.... $13,661	5.0
Expenses.....	165,632	192,509	Dec.... 27,477	14.3
Net earnings.....	$96,110	$82,294	Inc $13,816	16.8
Earnings per mile.....	2,692	2,833	Dec.... 141	5.0
Per cent. of expenses..	63.20	70.05	Dec.... 6.85	9.8
Six months ending June 30:				
	1875.	1874.	Inc. or Dec.	P. c
Cleveland, Columbus, Cincinnati & Indianapolis.	$1,734,314	$2,017,048	Dec.. $282,734	14.0
Working expenses.....	1,281,614	.....	.....	....
Net earnings	$452,700	.....	.....	....
Earnings per mile	3,682	$4,282	Dec.. $600	14.0
Per cent. of expenses..	73.90	.....	.....	....
Two months ending June 30:				
	1875.			
New Castle & Franklin..	$11,001	.....	.....	....
Expenses	4,100	.....	.....	....
Net earnings.....	$6,901	.....	.....	....
Earnings per mile.....	306	.....	.....	....
Per cent. of expenses..	37.27	.....	.....	....
Month of May:				
Denver & Rio Grande....	$35,536	$38,084	Dec.. $2,548	6.7
Expenses	17,190	17,025	Inc.. 165	1.0
Net earnings.....	$18,346	$21,059	Dec.. $2,713	12.8
Earnings per mile	296	317	Dec.. 21	6.7
Per cent. of expenses..	48.38	44.70	Inc.. 3.68	8.2
Month of June:				
Cairo & St. Louis.....	$25,653	.....	.....	....
Central Pacific	1,711,000	$1,366,614	Inc.. $344,386	25.2
Denver & Rio Grande....	35,329	30,291	Dec.. 3,962	10.1
Illinois Central.....	599,928	692,416	Dec.. 92,488	13.4
Indianap., Bloom. & W..	79,337	130,164	Dec.. 50,827	39.1
Int. & Great Northern ..	74,280	75,144	Dec.. 864	1.1
Kansas Pacific	275,665	316,339	Dec.. 40,674	12.8
Keokuk & Des Moines..	66,488	49,954	Inc.. 16,534	33.1
Missouri, Kansas & Texas	218,094	237,420	Dec.. 19,326	8.1
New Jersey & New York.	16,846	10,458	Inc.. 6,388	61.4
Rockf'd, Rock Is. & St. L.	56,418	.....	.....	....
St. Louis, Alton & Terre Haute, main line.....	71,697	99,844	Dec.. 28,147	28.2
Branches.....	35,619	43,153	Dec.. 7,534	12.8
St. Louis, Iron Mt. & So.	275,300	238,608	Inc.. 36,692	15.4
St. Louis & Southeastern	65,083	96,939	Dec.. 31,856	32.8
Union Pacific.....	930 000	902 881	Inc.. 27,119	3.0
First week in July:				
Denver & Rio Grande....	$7,879	$8,697	Dec.. $818	9.4

Coal Movement.

Coal tonnages are reported as follows for the week ending July 10:

	1875.	1874.	Inc. or Dec.	P. c.
Anthracite.....	411,711	228,084	Inc..183,627	80.5
Semi-bituminous, Broad Top and Clearfield.....	19,735	.....	.....	....
Cumberland	52,980	.....	.....	....
Bituminous, Barclay.....	6,350	.....	.....	....
" Western Pa...	28,217	.....	.....	....
" West Va.....	4,698	.....	.....	....
Coke, Western Pa.....	11,107	.....	.....	....

The coal tonnage of the Pennsylvania Railroad for the first week in July was:

Anthracite, tons.....	14,247
Bituminous, "	49,288
Coke.....	11,114
Total.....	74,649

Railroad Traffic.

The shipments of through freight eastward over the Central Pacific road in June were as follows:

	1875.	1874.	Decrease.	P. c.
Tons.....	4,420	5,229	809	15.5

The leading item of freight this year was wool, of which 3,060 tons were shipped.

The freight traffic of the Utah Central and Southern roads for June was as follows:

	1875.	1874.	Decrease.	P. c.
Utah Central, tons.....	8,102	8,433	331	3.9
Utah Southern, "	3,646	6,338	2,692	42.5

On the Central the leading item of freight was 2,186 tons of coal and coke; on the Southern it was 1,786 tons of ore and bullion.

The Pennsylvania's Traffic in June.

The Philadelphia correspondent of the *Iron Age* says: "We learn that the Pennsylvania Railroad carried during June an unprecedented quantity of freight. The number of cars moved on the Philadelphia division of this road in June last was 76,870, or 13,858 more than were handled in the same month of 1874. The progress of the road since 1867 in this department may be judged from the following figures for same month each year, viz.: In June, 1867, there were moved 22,736 cars; 1868, 27,678; 1869, 31,523; 1870, 34,717; 1871, 40,350; 1872, 44,612; 1873, 57,788; 1874, 63,102; 1875, as above, 75,680, or 54,134 more cars of freight moved than in 1867, and nearly double the number. Of the eastern freights about one-fourth goes to New York; full one-half or more to Greenwich Point, on the Schuylkill, to the grain elevators, and the remainder to Girard Point, petroleum wharves and the city depots and wharves. Some queer figures are deduced from this statement. Thus the number of cars moved this year in June, if in single train, would extend 446 miles, or nearly one hundred miles beyond Pittsburgh if started at Philadelphia; or, giving twenty-three cars to a train, would make 3,342 trains for a working month of twenty-six days, or 129 trains daily. This is exclusive of passenger trains. Such was the demand on the road that all the engines and many of the men were worked day and night, and during the day spell there was danger of the water supply running short, as these freight trains alone, last month, required, between Philadelphia and Columbia, 1,290,000 gallons of water daily, or 7,740,000 weekly, the passenger and yard engines using 4,800,000 gallons more weekly on this division."

PERSONAL.

—Mr. Harry E. Sharpe, Corresponding Secretary of the Railway Association of America, who has seen service on railroads in India, the United States and Canada, and is an excellent critic of railroad working, has become proprietor of the St. Louis *Railway Register*, the name of which he has changed to St. Louis *Record and Railway Register*. He announces that the paper in future will be devoted to "the material interests of St. Louis," including transportation, mining and manufacturing. The *Register* has been one of the most respectable of the railroad papers, and Mr. Sharpe has the ability to improve it greatly.

—Mr. C. R. Reed has resigned his position as General Freight Agent of the Cincinnati, Hamilton & Dayton Railroad, and purposes withdrawing altogether from railroad business. His resignation takes effect August 1. Mr. Reed has been in the service of the company for 25 years altogether, and is regarded as a valuable and efficient officer.

THE SCRAP HEAP.

Railroad Manufactures.

The Brooks Locomotive Works at Dunkirk, N. Y., have contracted to build 12 engines for the Erie Railway.

The Wason Company at Springfield, Mass., has just finished nine passenger and 26 freight cars for a South American road.

The Ohio Iron Company at Zanesville, O., manufactures pig iron, assorted bar, hoops, angle iron, light T rail and railway spikes and axles. The annual capacity of the works is 12,000 tons of pig and 9,000 tons of manufactured iron. The mill has five trains of rolls, 20 boiling and eight heating furnaces.

The Watson Manufacturing Company's works at Paterson, which were recently destroyed by fire, are being rapidly rebuilt, and it is expected that the new shops will be ready for use by October 1. Work is being pushed on the contracts on hand, a large force being employed in the buildings left standing and elsewhere.

The Paterson *Press* says: "At the Rogers Locomotive Works, as stated yesterday, the prospects of an increase or continuance of work are not encouraging. Though they will be perhaps compelled to discharge many if not most of the men by the first of August, the company will not close the place entirely, and will be ready at any time to receive whatever new work they have a chance to obtain in the way of building locomotives. The South American trade is looked forward to as the only hope for the Fall and Winter business.

"The Danforth Works employ at present nearly 400 hands, and have work to keep them busy in the locomotive and machine departments together for a considerable time. The building of silk and cotton machinery is almost the only business that enables them to retain their present force of hands."

The Ramapo Wheel and Foundry Company has recently received orders for 600 car wheels from the Argentine Republic, and for 200 from an English car-building company.

Riehle Bros., of Philadelphia, are putting in two of their patent "self-adjusting" railroad track scales at the Warwick Iron Company's new furnaces at Pottstown. They are also erecting two on the Chester Valley and the Berks County railroads.

The Indianapolis Rolling Mill Company is turning out iron rails for the Evansville & Crawfordsville road, and has closed a contract to re-roll several hundred tons of old rails for the Fort Wayne, Jackson & Saginaw road.

The Parkersburg (W. Va.) Rolling Mills have a contract for a large lot of new iron rails for the Cincinnati, Hamilton & Indianapolis road.

The rail mill of the Roane Iron Works, at Chattanooga, Tenn., is running nearly full time. The puddling-mill is running full double turn.

Some months ago the National Iron Works, Danville, Pa., were sold at assignee's sale to the Hancock Steel & Iron Company, subject to the then existing mortgages. This company, says the *American*, after a brief existence, was forced into insolvency, and an application made by its creditors, at the late term of the court, for the appointment of a receiver. This petition was granted, and a receiver appointed under the direction of the court. Now a speedy effort will be made to force a *bona fide* sale of the entire works to satisfy the claims of these creditors. The *American* says that there is a possibility, even a probability, that Mr. John Roach, the great ship-builder, will be a bidder at the sale.

The report of the President of the Bethlehem Iron Company, read at the annual meeting, June 29, showed that in spite of the dull times the company made a net profit of upward of $30,000 in the past year, while there are orders on hand to run the steel mills for the greater part of this year. The following board of directors was re-elected for the coming year: Alfred Hunt, Jacob Riegel, Joseph Wharton, R. H. Sayre, E. P. Wilbur, John Knecht and Arlo Pardee.

The Ranlet Manufacturing Company at Laconia, N. H., is building a large number of cars for the Hoosac Tunnel fast freight line. They are being delivered at the rate of four per week.

The Mason Machine Works at Taunton, Mass., have just completed the engines for the Boston, Revere Beach & Lynn road. They are of three-feet gauge and, we believe, of the Mason double-truck pattern.

A Train Telegraph.

In the report of patents issued during the week ending May 18 is one to Mr. A. N. Towne, the General Superintendent of the Central Pacific Railroad. It is described as follows:

"An insulated cylinder or circuit-breaker designed for use with an elastic conducting cord extending from end to end of the train. 1. A signal apparatus for railway trains, consisting of two complete electric circuits connecting with the opposite poles of a different magnet, one of which circuits passes through the entire length of the train, so that when the train-circuit is ruptured the remaining circuit will cause the armature of the magnet to vibrate back and forth and ring a bell. 2. An insulated cylinder or circuit-breaker, with a screw, in combination with a spindle, with its short barrel and surrounding spring, said barrel having a projecting spring-rod."

A Dead Beat Beaten.

A few days ago a man named Wm. Williams presented himself at the office of Mr. S. B. Jones, General Southern Passenger Agent of the Pan Handle Railroad, in Cincinnati, and stated that he was the representative of the *Commercial Advertiser* in Chicago, and desired a pass to Pittsburgh. A pass was furnished him, and the same was found in a scalping office for sale a few hours later. The railroad company immediately had Williams arrested, and he was tried, fined $10 and ten days in the work-house. Mr. Ford, of the *Commercial Advertiser*, sent a witness to prove that this man had no connec-

tion with his paper, and assisted in having him brought to justice.

The Springfield Bridge.

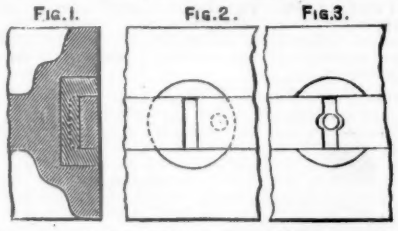
Some one has sent to Mr. Charles Bender a Springfield *Republican* with this item marked:

"Foreman Donaldson has a gang of men at work on the Boston & Albany iron bridge across the Connecticut, tightening rivets and putting in new ones where others have worked loose."

Jointing Piston Rings.

We annex a sketch illustrating a neat way of making the joints of piston rings, which has been devised by Mr. Edward Reynolds. As will be seen from the sketch, which is almost self-explanatory, the break-joint piece is fitted into a cylindrical recess in the piston body, and may either be secured to one end of the ring, or held out by a separate spiral spring with a

FIG. 1. FIG. 2. FIG. 3.



pin to prevent the joint from getting away from it, as shown. It is quite unnecessary to bed the crossing-piece to the back of the ring, and the groove in it may be formed when turning the piston. This mode of making joint pieces, like many other details which Mr. Reynolds has devised, is very simple, and can be made and fitted much more cheaply than the forms of joint pieces ordinarily employed. To many of our readers the device may be useful.—*Engineering.*

St. Gothard Tunnel Progress.

The average daily progress on the two headings of this great tunnel for the first four months of 1875 was as follows:

	Northern entrance.	Southern entrance.
January	9.81 feet.	10.83 feet.
February	9.71 "	11.89 "
March	9.77 "	9.06 "
April	10.80 "	14.12 "

On the northern heading the rock has been granitic gneiss throughout; on the southern, in January, micaceous schists; in February, the same, with veins of quartz; in March, crystalline schists; in April, micaceous schists again.

New Signals.

At a recent exhibition of railroad apparatus at the Crystal Palace in London new signals were shown which we find described as follows:

"Two inventions for automatic signalling are shown, the development of both of which owes something to the enterprise of the Chemin de Fer du Nord. M. Lartigue places on the road a plate connected with a battery. The engine is provided with a wire brush, which touches the plate in passing. When the signal is at 'danger' the effect of the brush touching the plate is that a current is sent which weakens the force of an electro-magnet upon the engine, and a lever falls and blows the steam-whistle. These arrangements have been adopted on the Chemin de Fer du Nord. The same railway company, for all express trains, have a commission to consider an invention of Sir David L. Salomons, by which every engine is converted into a signal. An extra line or wire is laid along the lines, and if an engine comes upon the block where there is already another engine an electric circuit is formed by means of the extra line or wire, and the bells of both engines are set ringing. The block signals of the Southeastern and Brighton are also shown. They supplement electric and magnetic forces by the still more variable agency of man."

RAILROAD LAW.

Liability for Stolen Bonds.

In the suit of Martin Haas and others against the Missouri, Kansas & Texas Railway Company and the Union Trust Company, the New York Supreme Court recently gave a decision of some importance. The plaintiffs owned nine bonds of the Tebo & Neosho Railroad Company, which was afterwards consolidated with the Missouri, Kansas & Texas, and bonds of the consolidated company issued in place of the old ones, the Union Trust Company making the exchange. Plaintiffs sent in their bonds, and the Trust Company refused to exchange them, on the ground that these bonds were stolen from Mr. J. H. Frothingham, their President. A referee in the suit found that these bonds were signed by the President and Secretary of the railroad company, but that the seal of the railroad company was counterfeited, and that the counter seal of President Frothingham was forged. However, as plaintiffs purchased the bonds in good faith without knowledge of these defects, he decides that the bonds are good; that the Union Trust Company must exchange them; and that the Missouri, Kansas & Texas Railway Company, as the bonds have fallen from 92 to 49, must pay $430 cash per bond for the depreciation.

The Court confirmed the referee's report and ordered that judgment for $4,748.03, the amount of depreciation with interest, be entered against the railroad company, and that an order be also made directing the Union Trust Company to exchange the bonds.

Right of Way Through Public Lands.

The Secretary of the Interior has issued the following circular:

"The first section of the act approved March 3, 1875, granting to railroads the right of way through the public lands of the United States, requires a copy of the articles of incorporation of railroad companies claiming the benefits of the act to be filed with the Secretary of the Interior, together with due proofs of organization under such articles. For the government of parties in interest the following regulations have been adopted as to what shall constitute and be filed as said due proofs:

First—A copy of the State or Territorial law under which the company was organized, with the certificate of the Governor or the Secretary of the State or Territory that the same is the existing law now in force.

Second.—When the said law directs that the articles of association or other papers connected with the organization be filed with any State or Territorial officer, the certificate of such officer that the same have been filed according to law, with the date of the filing thereof.

Third.—The official statement, under seal of the proper officer, that the organization has been completed; that the company is fully authorized to proceed with the construction of the road, according to the existing law of the State or Territory, and that the copy of the articles filed with the Secretary of the Interior is duly verified by the sworn statement of the President, under the seal of the company, showing the names and designation of its respective officers at the date of the presentation of the proofs at this department."

OLD AND NEW ROADS.

Chicago, Rock Island & Pacific.

This company is offering for sale through L. T. Hoyt, banker, of New York, a limited amount of 6 per cent. sinking-fund bonds. The amount authorized is $1,000,000; they are dated August 2, 1875, and mature August 1, 1895, interest payable February and August. The sinking fund provision is as follows:

"A sinking fund of $40,000 per annum shall be set aside for the ultimate redemption of this issue of bonds, which shall commence on the 1st day of January, 1877, which fund together with the accumulated interest is to be invested in these bonds, provided they can be purchased at par and accrued interest, and if they cannot be purchased at such price then such fund shall be invested in the mortgage sinking fund bonds of this company, at a price not exceeding 5 per cent. premium and accrued interest."

"It is also hereby stipulated between the company and the holder of this bond that in case of any subsequent mortgage on the property of this company before the maturity of said bond, that such mortgage shall be made to cover and include this issue of bonds."

The money received for these bonds is to be used for the extension westward of the Sigourney Branch, and for other improvements.

By the last report, this company's yearly interest charge was but $1,003 per mile, while its net earnings were $5,237 per mile. A better secured bond is not often met.

Colorado Central.

A special meeting of the stockholders is to be held in Golden, Col., August 12, to vote on the ratification of the agreement for the consolidation of the company with the Kansas Pacific.

Connecticut Railroad Taxes.

A bill has passed the Connecticut Legislature postponing the collection of the taxes due from from the Connecticut Western, the Connecticut Valley and the Boston & New York Air Line (New Haven, Middletown & Williamantic) companies. It does not remit the taxes entirely, but only gives more time. The reason for the bill is that the companies are entirely unable to pay.

Auction Sales of Railroad Securities.

In New York, July 21, at auction, Paris & Danville first-mortgage 7 per cent. gold bonds sold for 6 per cent. of the face; Burlington, Cedar Rapids & Minnesota first-mortgage Milwaukee Division 7 per cent. bonds, 31¼.

Des Moines & Fort Dodge.

The lands in Deer Creek and Douglass townships, Webster County, Iowa, in odd sections, within five miles of the Des Moines River, coming within the land grant of the Des Moines Valley Railroad, aggregating upwards of 30,000 acres, were sold by execution, issued under foreclosure decree, at Fort Dodge, Iowa, July 10. These lands are also claimed by the Iowa Homestead Company as part of the land grant of the Dubuque & Sioux City road. The United States Circuit Court has once decided in favor of the Des Moines Valley, but the case was appealed to the Supreme Court. These lands were all bid in at the sale by George B. Smith, on behalf of the Des Moines & Fort Dodge Company, the successor, as to the land-grant section of the road, to the Des Moines Valley Company.

It is stated that there is no foundation for the report that this company was about to lease its road to the Keokuk & Des Moines Company.

A Southern Railroad Meeting.

A meeting of Southern railroad managers was held in Atlanta, Ga., recently, Gov. J. E. Brown, President of the Western & Atlantic Company, presiding. The convention was called to ratify the action of the representatives of a number of Southern roads, who were in conference in New York several weeks since. The following freight rates from Atlanta to Baltimore were adopted: First class, $1.60 per 100 pounds; second, $1.30; third, $1; fourth, 85 cents; fifth, 75 cents; sixth, 55 cents. The rates to Boston, New York and Philadelphia from Atlanta are 10 cents per hundred higher for the three first classes, and five cents per hundred higher for the remaining classes.

It is understood that the East Tennessee, Virginia & Georgia and the South Carolina companies refused to enter the pooling combination of freights proposed by the various other lines. They did not object to the reduction in rates, but held that it was their privilege to act independently. After considerable discussion it was resolved to give the two companies ten days to consider the matter. If they adhere to their refusal harsh measures will be taken by the other lines, and every possible discrimination used against them.

An invitation was received to visit the Baltimore & Ohio Company's new summer resort at Deer Park, and an adjourned meeting will be held there next month.

Valley, f Virginia.

A partial settlement has been made with the contractors. With Mason & Shanahan, on whose work there was no dispute, the company has agreed to pay one-fifth down and give negotiable notes for the residue at four, six, twelve and eighteen months, and also agreed to allow some compensation for shanties. With the other contractors, Merrifee & Ballard and McMahon & Green, the amount due is in dispute, the contractors' estimates not agreeing with those of the Chief Engineer. Negotiations for a settlement are in progress.

Sedalia & Benton.

It is proposed to build a railroad from Sedalia, Mo., southward about 20 miles to Cole Camp, in Benton County, which is the center of an extensive lead mining region.

Commissions on Ticket Sales.

A St. Louis dispatch says: "The agreement among certain railroad companies not to pay commissions for the sale of tickets has, it appears, been broken lately. Several of the roads are now paying commissions. The St. Louis & Iron Mountain Railroad is now paying $3 on all tickets sold from St. Louis to Nashville, and $3.50 on all tickets to Chattanooga and other points South. It is understood there are also several other lines out of St. Louis that are paying commissions."

New York & Canada.

The Delaware & Hudson Canal Company, the lessees, are now running over this road, which skirts along the shores of Lake Champlain, what is termed an observation or twilight car. The sides are wholly removed as low as the window sills, leaving a clear open space for viewing scenery. Strong curtains are fixed above the opening, so that in case of storm they can be lowered and fastened. Two seats run the entire length of the car, back to back.

San Luis Obispo & Santa Maria Valley.

Mr. L. H. Shortt, Chief Engineer, writes to us as follows:

"In your issue of June 5, after referring to the consolidation of the two roads under the name of the San Luis Obispo & Santa Maria Valley, you say that work has almost ceased and the company has demanded a subsidy from the town.

"This is not correct. Subsidies have been declared illegal in this State, but we do hope and expect that the principal merchants and landholders will take more stock in the road than they have already done. The work goes on quietly and steadily. We have iron and ties on hand, and will lay four miles of track next month, or by the time our engine arrives here. It has been ordered from the Baldwin Locomotive Works."

Quebec Frontier.

The directors of this company have ordered a survey of the line from Clarenceville, P. Q., to Alburg, Vt., and hope to put a part of it under contract this year. Aid is expected from Stanbridge and other towns.

Ottawa & Cotean Landing.

Work is to be resumed on this Canadian road, part of which was graded in 1873.

Montclair.

The committee which was instructed to carry out the plan of reorganization adopted at the meeting of June 9 has requested all the bondholders whose bonds have been deposited with the trustees to give those gentlemen written instructions to allow the bonds to be used in the purchase of the road by the committee. It is said that the trustees claim that the bondholders signed an agreement with them, and they do not intend to recognize the action of the meeting, but will attend to the purchase of the road themselves.

There has been some complaint that the Managing Trustee has large interests which are to a certain extent dependent upon the road, and that his evident purpose is to keep the management of it in his own hands. His personal character and standing, however, preclude any suspicion of dishonorable dealing. The other trustee has taken little or no active part in the matter.

Vermont Central.

The adjourned hearing on the petition of the Central Vermont for an enforcement of the consolidation of the interests embraced in the trust and on the petition of the second-mortgage bondholders for leave to sell the property of the Vermont Central under their mortgage was held before Judge Royce at St. Albans, last week. The counsel for the second-mortgage trustees said that they did not come to the Court for authority to sell; that they acquired under the mortgage, two-thirds of the bondholders having asked for a foreclosure, but they desired to avoid all questions.

An answer was filed objecting to the sale until the liens upon the property had been determined. The Rutland Company also put in an objection to the sale as a creditor of the trust.

Judge Poland, as counsel for the Central Vermont, argued that that company should be allowed to purchase, not in its own interest, but for the benefit of the beneficiaries under the trust. It subsequently appeared that he had mistaken the scope of the petition somewhat, and he had to explain away a part of his first argument, the opposing counsel having claimed that on his own showing the petition he was advocating ought not to be granted.

On behalf of the second-mortgage bondholders who had not come into the agreement, objection was made to the sale, and it was charged that the trustees and the bondholders' committee were acting in the interest of the Central Vermont and not of the bondholders. It was also urged that there was a doubt as to the legality of the liens put upon the property by the trustees, which were sufficient to absorb the whole property. This question ought to be decided before the petition was granted.

The court reserved its decision.

Boston & Albany.

The first section of Hall's electric signals on this road was to be put in operation this week. It extends from Boston Station to Newtonville, eight miles. The second section will extend from Newtonville to Natick, nine miles.

The question of land damages having been settled, work has been begun on a large new brick depot at West Newton.

New York, New Haven & Hartford.

The Railroad Committee of the Connecticut Legislature having investigated the charges made by Mr. H. L. Goodwin against this company have made their report. The chief points in controversy before the Committee were with reference to the following questions, which are among those required by the Railroad Commissioners to be answered by railroad companies annually:

1. Capital stock actually paid in.
2. Capital stock issued for earnings which had not been divided among the stockholders.
3. Capital stock issued upon which no payment had been made either in cash or its equivalent.

After hearing and considering the evidence upon these points, the Committee came to the conclusion that the proper and legal answer to the first question is the amount of full paid capital stock issued, whether such stock was sold by the company at par, under par or above par, and that such is the construction put upon it by bank, insurance, railroad, manufacturing and other corporations in Connecticut and other States. The only practical importance of the question is to ascertain the amount of capital stock for which the company is legally liable as full paid stock.

The Committee say that the proper answer to the second question is the amount of capital stock issued to the stockholders and charged to profit and loss and surplus account.

The proper answer to the third question is the amount of capital stock issued upon which no payment has been made, and does not strictly include any share or shares of stock upon which some payment has been made, be it ever so little.

In view of these facts the Committee gave the opinion that the annual returns of the company on these points, as given to the Railroad Commissioners, are correct and in accordance with law, and that this company not only has not issued any fictitious or watered capital, but in point of fact received for its capital stock issued ($15,500,000) property having, at the time of the issue of such stock, an actual cash value of over $7,000,000 above the par value of its stock.

Western Maryland.

The Baltimore *Gazette* thus describes the new depot which is to be built for this road in Baltimore:

"The ground for this depot has been secured by the agents of the Western Maryland Railway, at the intersection of Exeter and Hillen streets, within a square very near Monument street bridge, and of very easy access from that direction. The lot which will be built upon is about 400 feet long by 150 feet wide, and on this will be placed a structure covering about 300 by 100 feet in roof. It will commence at the northeast corner of the lot at the intersection of Hillen and Exeter streets. The office building will front 80 feet on Hillen street by about 45 on Exeter. It will contain on the first floor, besides the spacious entrance, a large waiting hall, which, with the ticket office and two private rooms for ladies and gentlemen, will occupy the largest part of the 80 feet of building. On Exeter street there will be an entrance for the use of freight offices on first floor, and for the up-stairs offices, which will be the principal business places for the company. On this second floor, near the landing from the stair, will be found the offices of the President and General Manager, around him those of his clerk, of the Secretary and Treasurer, and toward the south end of the building two large rooms will accommodate the Auditor, and leave room for one chamber devoted to storing papers and other property of the company, and for a coat-room with water and other conveniences. Immediately in the rear of this office building is the shed where the trains will arrive nd leave, and where freight will be received and

delivered. This building will be 220 feet long by 80 wide. It will have two passenger platforms and three passenger tracks, also two freight tracks and their platforms, so arranged as to permit the free use of drays. In the yard there will be several other tracks, both for storage of cars and for loading and unloading several classes of freight that will be more easily handled in the open space.

"The purchase of the land was skillfully managed by Mr. Ichabod Jean, and was effected on reasonable terms. The station itself is economically planned, and will be built by contract, under the superintendence of Mr. J. Crawford Neilson, the architect of the railroad company."

Erie.

Mr. Dorman B. Eaton has been retained as counsel to prosecute the claims of the company against James McHenry and the London Banking Association. He will go to England for that purpose.

The Supreme Court has denied the application for the appointment of a new trustee under the second mortgage of the Buffalo, New York & Erie road, on the ground that it is wholly unnecessary and likely to lead to useless expense and litigation. There are only $262,000 bonds under this second mortgage outstanding, and interest on that has been regularly paid and the principal never demanded. The relations of the two railroads are such that ultimately the Erie will have to provide for the payment of these mortgage bonds to preserve the lease.

Providence, Ponagansett & Springfield.

The bill chartering this company has passed both houses of the Connecticut Legislature. The road is to be the extension through Connecticut of the projected Ponagansett Railroad of Rhode Island, and will run from the State line near Danielsonville northeast in the direction of Springfield, Mass., to the Massachusetts line.

Woodstock.

Tracklaying is now in progress and the rails are down for three miles southwest from White River Junction, Vt.

Buffalo, New York & Philadelphia.

The machine and blacksmith shop and offices of this company in Buffalo, N. Y., were destroyed by fire early on the morning of July 18. Three engines were run out of the machine shop, and the patterns, tools and papers in the offices were saved, but the contents of the blacksmith shop, the tools and machinery in the machine shop were destroyed. The damage is estimated at $40,000; fully insured.

Lewisburg, Center & Spruce Creek.

The lease of this road to the Pennsylvania Railroad Company has been extended a year, until July 22, 1876.

New Egypt & Farmingdale.

The grading of the section of this road now under construction, which extends from the terminus of the New York & Long Branch road at Long Branch, N. J., southward through Asbury Park and Ocean Grove to Ocean Beach, is finished. Everything is ready for the tracklayers, who will soon begin work.

Louisville, New Albany & Chicago.

The suit of Charles E. Bill, trustee, against this company will come up in the United States Supreme Court at the fall term, on appeal from the Circuit Court and petition to have the foreclosure and sale of the road set aside.

Des Moines, Indianola & Missouri.

At the annual meeting in Des Moines, Ia., recently, the stockholders unanimously voted to confirm the lease of the road heretofore made to the Chicago, Rock Island & Pacific company.

Woodland & Colusa.

The agent of the California Pacific has been securing the right of way for this proposed road from Woodland, Cal., northward up the west side of the Sacramento to Colusa. The work on the road will be very light, and there is talk of building it this season.

Chicago & Lake Huron.

Work is said to be in progress on the line between Lansing, Mich., and Flint, and the company expects to get it completed so far this summer that a connection can be made between the two divisions of the road by the way of Owosso and the Jackson, Lansing & Saginaw road from that place to Lansing.

Louisville, New Albany & St. Louis.

Col. Horace Scott, President of the company, has been appointed Receiver in the foreclosure suit, and has taken possession of the road.

Richmond & Mecklenburg.

In connection with the construction of this road from Clarksville, Va., northward to the Richmond & Danville at Keysville, it is now proposed to rebuild the old Roanoke Valley road, which was formerly in operation from Clarksville, Va., southeast to the Raleigh & Gaston at Manson, N. C. It is expected that the Raleigh & Gaston Company and the city of Petersburg will assist in the matter.

Worcester.

The extension of this road from Snow Hill, Md., southward is graded to Stockton, nine miles, and tracklaying was to be begun this week.

New Jersey Railroad Taxation.

Maj. James S. Yard, New Jersey State Commissioner of Railroad Taxation, has made his report to the Comptroller for the year ending June 30. During the year returns were made of property not previously assessed, belonging to 16 railroad companies in 22 towns and cities, amounting to $241,652. The total valuations returned have been as follows: Amount returned in 1873, $12,577,301; in 1874, $4,178,222; in 1875, $241,652; total, $16,997,175. Under the present law railroad property once assessed cannot be valued again for three years, hence the amounts returned for the two last years were only additional and supplementary to that returned in 1873, the first year of the operation of the law. The property valued in 1873 will be subject to a new assessment and valuation in 1876, next year.

In the case of the Morris & Essex Company against Yard, Commissioner of Taxation, the Court of Errors and Appeals has affirmed the decision of the Supreme Court. The question was whether the company was liable to assessment under the general law relative to taxing railroad companies. The company claimed that it was not affected by it on account of a special provision in the charter. The Court held the provision not irrepealable and the company liable to assessment under the act.

This decision, it is thought, is generally applicable to all the older companies which claim exemption from local taxes under their charters, except possibly the United Companies.

Sussex.

In 1869, when the extension to Franklin Furnace was about to be built, it was proposed to leave the old line at Andover, N. J., and build from that point through Sparta Village, leaving Newton, which was then the terminus, on a branch line. To prevent this a number of citizens of Newton pledged themselves to contribute $25,000 to pay the additional cost of the line from that place over that by Andover and Sparta. In 1872, this sum being still unpaid, authority was obtained from the Legislature, and town bonds for $25,000 were issued to the company. Recently there has been much talk of refusing to pay these bonds, and this year the town committee declined to levy the usual tax to provide for the interest. Accordingly the holders of the bonds have brought suit in the United States Circuit Court to compel the levying of the tax and the payment of the interest. The town committee say that they took their course because they believed that the question of the legality of the bonds could be most quickly decided in this way.

The extension from Franklin Furnace to a connection with the Warwick Branch of the Erie has been for some time completed to McAfee Valley, about four miles north by east from Hamburgh, N. J. Between Franklin and Hamburgh, three miles, the New Jersey Midland track is used. This extension is used mainly for milk traffic and for the iron ore from the Pochuck mines.

McKean & Buffalo.

This road is now completed and in good order, and trains are running regularly over it. It is 22.15 miles long, from a junction with the Buffalo, New York & Philadelphia road at Larrabee, Pa., to Clermont, the general direction being south by west. It has been built mainly to serve the mines of the Buffalo Coal Company, which are at Clermont. The business of the new road was somewhat interfered with by a strike among the miners which took place just as it was opened, but most of the strikers have been dismissed and their places filled, and coal is now being shipped in fair quantities. The road is substantially built, with good truss bridges, and is laid with 60-pound steel rails. There are five miles of sidings.

The stations, with the distances from Larrabee, are as follows: Frisbee's, 2.41 miles; Farmer's Valley, 5.34; Smethport, 9.04; Crosby, 14.14; Colegrove, 15.15; Hamlin, 16.26; Wernwag, 20; Clermont, 22.15. The time-table shows three trains each way, a through freight and passenger between Larrabee and Clermont, a local freight and passenger between Larrabee and Hamlin, and a coal train between Hamlin and Clermont.

Wisconsin Central.

This company is endeavoring to obtain the capital to complete its road, there being now a gap of 60 miles between Worcester on the south and Penokee on the north. On the 101 miles between Stevens Point and Worcester, which was almost wholly a wilderness before the road was built—in good part a wilderness impenetrable by vehicle on draft animal—there has been a considerable settlement of lumbermen, and about 30 miles have been built.

Philadelphia & Erie.

Philadelphia papers say that the current account with the Pennsylvania Railroad Company, lessee, has been settled by the transfer to the latter of Philadelphia & Erie and Allegheny Valley bonds to the amount of the balance of the account, about $1,000,000.

Vera Cruz & Jalapa.

This new Mexican railroad was opened through to Jalapa June 17.

Lehigh & Eastern.

The final survey and location of this road from Port Jervis down the Delaware Valley is in progress.

Cincinnati Southern.

The trustees advertise for proposals for the foundation and masonry of the bridge over the Tennessee River at Chattanooga. The north abutment will rest on rock, the south one on a pile foundation. The draw pier and the seven other piers will be founded on the solid rock bottom. The stone used is to be of the best quality of limestone, and the river must be at all times left free for the passage of steamboats.

Dividends.

Dividends have been declared by the following companies:

Terre Haute & Indianapolis, 5 per cent., semi-annual, payable July 20.

Delaware, Lackawanna & Western, 2½ per cent., quarterly, payable July 26.

Old Colony.

The Boston *Advertiser* says: "The workmen on the new bridge at Fall River are putting down the last of the greater cylinders on the third pier from the eastern shore, in 52 feet depth of water, and some 22 feet depth of earth below. The pier next east of that stands in 55 feet of water. When this is done there remain only the six small cylinders to set around the central one, on which the pivot of the draw is to stand, and which is already set, and workmen are completing the carpenter work of the draw pier, which is built on piles. The two stone abutments—one at each end—are finished, and a frame extending from the eastern abutment to the second pier is being constructed to aid in raising the first span. The foundation is all ready for the easternmost span, and the frame work will be completed, so that during next week the real bridge work can begin. It is intended to have all the cylinders in position by the middle of August, and it is thought if no drawbacks interfere the whole structure will be completed by the middle of November."

European & North American.

The Bangor (Me.) *Whig* of July 19 says: "A sub-committee of the investigating committee of the creditors of this company completed on Saturday a careful examination of the road and rolling stock, and we learn that they express themselves much pleased with the generally good condition of the railway. Great pains have been taken by outsiders to create an impression that the track has been allowed to run down and deteriorate so as to render the road unsafe for travel, and we are glad to know that a committee, composed largely of experienced men, assisted by most reliable engineering talent, pronounce the road not only safe, but in as good condition as most roads of its class, fully sustaining the statements made by Messrs. Jewett and Blake, at the meeting held here.

"A meeting of the whole committee was holden on Friday evening, and we learn that it was then considered probable that very shortly the committee would be able to report a plan for the adjustment of the present financial difficulties of the company."

National Telegraph Company.

This company has been organized in San Francisco for "the construction, conduct and maintenance of telegraph lines between the cities of New York and San Francisco, and between said cities and all other principal cities and towns in the United States and in the Territories thereof, and in the Dominion of Canada, and to connect by said telegraph lines of said principal cities and towns with each other." The estimated length of the lines is 75,000 miles. The capital is $25,000,000, of which $7,500,000 has been subscribed and 10 per cent. is said to have been paid in. The board of directors includes Messrs. Reese, Atherton, Sharon and others, who are well-known as capitalists and mine-owners in California and Nevada.

New York & Oswego Midland.

The final entering of the decree of foreclosure has been postponed by the Court from July 13 to August 4.

The competition between the various committees is growing very lively, and frequent appeals are addressed to the first mortgage bondholders to induce them to deposit their bonds. The Jordan-Cowdrey committee claims to have $2,850,000 actually deposited with them, besides enough more promised to make a majority. The Opdyke committee is said to have about $1,250,000, and the Utica committee $500,000, which, if correct, would leave about $3,400,000 out of the $8,000,000 still unpledged to any of the existing plans of reorganization. It is not impossible that the Utica committee may eventually be so placed as to hold the balance of power between the Cowdrey and Opdyke committees. It is most probable, however, that there will be a compromise between the various parties, as no one of them will have a majority large enough to dispense with the assistance of the minority, and no outside party is likely to interfere.

New Orleans & Pacific.

The surveys of the proposed line from Alexandria on Red River to Marshall, Tex., have been begun. The present intention of the company is to begin work at Alexandria and build to Nachitoches, 60 miles, with the money realized from stock subscriptions, and then issue bonds upon the completed section to supply means for extending the road. The estimated cost of the Nachitoches is $500,000, which is only $8,333 per mile, an exceedingly low figure. About $200,000 has already been subscribed.

Cairo & St. Louis.

Colonel Taylor, the late President, has finally turned over the books and property of the company to the new board. The old board resolved to contest the election, but the President, having taken legal opinions as to its validity, declined to make any further opposition.

Burlington, Cedar Rapids & Minnesota.

The United States District Court has retired Mr. Walker, the provisional Receiver, and has appointed Gen. E. F. Winslow, President of the St. Louis & Southeastern, permanent Receiver. In making the order, the court expressed the opinion that the property was safe in Mr. Walker's hands, but that it was only right that the wishes of the bondholders should be consulted in the matter, and as they asked for General Winslow's appointment, the request was granted.

Green Bay & Minnesota.

The La Crosse (Wis.) *Republican* says: "We understand the Green Bay Railroad managers have intimated that if La Crosse will contribute $50,000 to their company they will abandon Winona and make this city the terminal point of their road on the Mississippi River."

St. Louis, Keokuk & Northwestern.

The engineers are finishing up the estimates and final location, and it is said that contracts for the extension from Hannibal, Mo., to Louisiana, some 28 miles, will soon be let.

New England Railway Passenger Conductors' Benevolent Association.

This association was organized in Massachusetts, June 21, 1875, under a new law, which permitted its formation without the necessity of a charter, which was strongly opposed by the life-insurance interests. The membership is limited to five hundred, and the object of the association, as stated in article two of the constitution, is "the promotion of moral, temporate and social relations among its members, and to provide pecuniary aid for the widows and children, heirs or representatives of those of our number who may die or lose their lives amid the dangers and perils of a hazardous vocation."

Pueblo & Arkansas Valley.

The Colorado Supreme Court has refused to grant the application of the Kansas Pacific and Arkansas Valley companies for an injunction to restrain this company and the Atchison, Topeka & Santa Fe from building the road on the line located.

Montpelier & Barre.

This road is now completed, and its opening was celebrated in due form, July 5. It has been under construction over a year, and is about six miles long, from Montpelier, Vt., southeast to the town of Barre.

Wabash & Erie Canal.

The United States Circuit Court, in the case of Gapen against the trustees of the canal, has made an order directing that the canal and property be sold to pay the debt due the bondholders. Judge Gookins was appointed trustee to manage the execution of the order. The canal extends from Toledo, O., to the Ohio River at Evansville, Ind., and has long since ceased to be a property of any value. Indeed it has in great part been abandoned. The whole debt is about $7,500,000.

Richmond & Mecklenburg.

The trustees of the old Roanoke Valley road have made a contract to turn the property over to the new company, and that contract has been approved by the board. The terms are said to be satisfactory to all parties. Considerable grading has been done on the Roanoke Valley line, between Clarksville and Chase City, Va.

Rockford, Rock Island & St. Louis.

Mr. Henry W. Bishop, master in chancery, gives notice that under the decree of foreclosure granted by the United States Circuit Court, he will sell at public sale in Chicago, August 10, the Rockford, Rock Island & St. Louis, and the Orion & Minersville roads, with all the real and personal property belonging to them. The property is to be sold in one parcel and of the purchase money $200,000 must be paid in cash. For the balance he will receive outstanding bonds and unpaid coupons, or certificates issued in lieu of coupons. These shall be taken at such percentage of their face value as the court may direct.

The Receiver, Mr. W. H. Ferry, reports as follows for June:

Balance from previous month	$36,836 06
Receipts for month ($193 per mile)	56,417 78
Total	$93,253 84
Payments in June (130.29 per cent of receipts)	73,505 54
Balance to July	$19,748 30

Connecticut Railroad Law.

The Committee on Railroads has reported to the Legislature an act appointing a commission to report to the next session a form for the annual returns made by the companies to the Railroad Commissioners, to take the place of the forms now used. The new returns to be simple, direct and void of all ambiguity. The commission to consist of Judge Carpenter, of the Supreme Court; C. B. Bowers, of New Haven; Wm. D. Bishop, President of the New York, New Haven & Hartford Company; David Torrance, of Derby, and George M. Woodruff, a member of the board of Railroad Commissioners.

Northern Pacific.

A meeting of the bondholders is called, to be held at the office of the company in New York, July 29, at noon, for the purpose of acting upon the nomination made by the remaining trustee of Charlemague Tower as a trustee under the general mortgage, in place of Wm. B. Ogden, resigned.

Chicago & Northwestern.

Our Amsterdam correspondent writes, July 3: "West Wisconsin bonds were constantly bought on New York account (some say for Baltimore also). It is probable that the issue of $10,000,000 common stock proposed by the Chicago & Northwestern is connected with these purchases. The New York *Tribune's* report of an interview with Mr. Sykes, the Secretary of the company, strengthens our opinion that the ownership of the West Wisconsin is the first aim of the Chicago & Northwestern. There were many buyers here, but for a month all the floating bonds have been purchased daily by the same broker, who does not force up the price, but takes all that he can get."

At the date of this letter, the Amsterdam quotation for

West Wisconsin bonds was 39¾, gold. The amount outstanding of the first-mortgage bonds of this road, covering the 178 miles from the junction with the Madison Division of the Chicago & Northwestern at Elroy to the Minnesota line at Hudson (whence to St. Paul a line is leased) is $4,455,500. Bought at 40, these would cost $1,782,200, or about $2,350,000 currency. This is at the rate of $10,000, gold, per mile, and it would give, substantially, the ownership of the road, whose net earnings in 1874, its most unfavorable year, were about $188,000. The road is indispensable to the Northwestern as a short connection with St. Paul, in competition with the Chicago, Milwaukee & St. Paul, and it is one of the best situated of the newer railroads, having much productive country on its line, and for most of its length no competition. The road can be more useful to the Northwestern than to any one else, and it would seem to be good policy to secure it when it can be had for half its cost or less.

Columbus & Toledo.

The board of directors has instructed the President to advertise for proposals for the construction of the road.

Southern Minnesota.

Notice is given that holders of certificates issued in exchange for 8 per cent. construction bonds having all the coupons attached will receive 3 per cent., or $30 per bond, on presenting their certificates at the office of the Farmers' Loan and Trust Company, No. 26 Exchange place, New York, for the purpose of having the amount of the payment stamped thereon.

Portland & Ogdensburg.

Work is progressing rapidly on the extension of the Vermont Division from West Concord eastward to the Connecticut River. The rails have been bought and tracklaying will soon be begun. The bridge over the Connecticut River is to be ready as soon as the track is laid to the river. The contractor for this section is James Savage, of Augusta, Me.

St. Paul & Pacific.

Under date of July 3 our Amsterdam correspondent writes that the Amsterdam financial journal, the *Kapitalist*, has announced that the Minnesota Supreme Court has adjourned, and that no decision in the foreclosure suit can be rendered until the next term, in October. The Amsterdam bondholder's committee announced last February that the decision would be given within two months, and that a receiver would be appointed before the end of August. Now the committee says nothing. Our correspondent writes: "We believe there will never be a receiver. The foreclosure suits were not properly brought. The foreclosure was asked because of pretended mismanagement on the part of the President, Mr. Geo. L. Becker. Every one knows that not only was his management good and faithful, but also that by the terms of the mortgage mismanagement is not ground for foreclosure. Lippmann, Rosenthal & Co. were the men who made all the arrangements with Wilmar, and as the latter died last year, it is easy now to impute all the disasters to the deceased. Though Weetjen is named President of the St. Paul & Pacific committee, its real chiefs are Lippmann, Rosenthal & Co., and the men who sold the bonds on his account."

St. Louis Fares.

It is reported that from St. Louis round-trip excursion tickets are sold as follows, good to return till October 1: New York, $25; Boston, $32; Buffalo and Niagara Falls, $20; Cleveland, $18; Put-in-Bay, $20. The New York ticket by the shortest route covers a journey 2,125 miles long, and so is at the rate of 1.11 cents per mile, which is less than the cost on any railroad in America.

Centennial Exposition Rates.

The general freight agents of fifteen leading Western railroads met Mr. D. Torrey, of Philadelphia, Chief of the Bureau of Transportation of the Centennial Exposition, in Chicago, July 14, to consult as to the rates to be charged on freight designed for the Exposition. After discussion it was agreed not to make any definite rates at the meeting, the Eastern lines not having taken action yet, but a resolution was adopted to agree to carry at the same figures per ton per mile, for all distances over 100 miles, as the Eastern roads may charge.

Cleveland, Columbus, Cincinnati & Indianapolis.

The Executive Committee of the Cleveland, Columbus, Cincinnati & Indianapolis Railway Company, in view of the following statement of the operations of the road for the first six months of the present year, have decided it inexpedient to declare any dividend for the present:

Receipts and disbursements for six months ending June 30, 1875, partly estimated:

Receipts—From all sources		$1,734,313 89
Disbursements—		
For operating expenses	$1,281,613 77	
For taxes	84,000 00	
For interest on bonds	184,000 00	
		$1,549,613 77
Balance		$184,700 12
Receipts as compared with 1874—		
For first six months, 1874	$2,017,048 05	
" " " 1875	1,734,313 89	
Decrease		$282,734 16
Loss as follows—		
On freight	$289,965 50	
On passengers	6,909 10	
	$296,174 60	
Less increase from all other sources	13,440 44	
		$282,734 16

This decrease in receipts is equal to 14 per cent. The surplus for the half-year is equal to less than 1¼ per cent. on the stock. The surplus for the entire year 1874 was $615,622.

Toledo, Wabash & Western.

The New York *Tribune* publishes the following: "The receiver of the Toledo, Wabash & Western Railroad, the Hon. J. D. Cox, in reply to a letter from a bondholder, gives the following information relative to the present financial condition of the road, which will interest those holding its bonds. He says that the net income of the company is sufficient to pay the interest on its first and second mortgage bonds, but by order of the court it is to be first applied toward extinguishing a debt mostly for labor and supplies, of about $700,000, which had accrued when he took charge of the road. Notwithstanding the great depression of business, it is anticipated that this indebtedness will be extinguished the current season in addition to paying the ordinary expenses. In May last a committee of the bondholders, appointed for that purpose, visited the road and were satisfied with the condition of the property and the economy of its management, and that the road is in as good condition, both as to track and equipment, as any road in the West. An effort is being made to induce the stockholders to unite upon a plan to raise the money necessary to clear off the floating indebtedness and enable the company to resume at once the payment of interest upon the earlier mortgages, at least, with strong prospect of success. In conclusion he believes it unwise to sell the bonds at current rates if the holder can afford to hold them."

Central of New Jersey.

The Newark *Advertiser* says: "Officers of this company say that the reports of the original cost of the bridge across Newark Bay, and of the expenditures for repairs have been exaggerated. The bridge is not quite two miles in length, was completed in 1864, at a cost of $800,000. In eleven years the average annual cost of repairs has been within $12,000. This present season it will be thoroughly repaired, and partially filled, at an estimated cost of $100,000. An estimate for an iron bridge to span the bay in place of the present structure was obtained, but as the interest on the sum would much more than keep the present structure in repair, the company decided not to make any change. It is the opinion of the United States engineers that a considerable portion of the bridge could be filled up with great advantage to the navigation of Newark Bay."

Boston, Barre & Gardner.

The stockholders have voted to authorize the issue of $300,000 7 per cent. bonds, having 20 years to run, and secured by a second mortgage on the road.

The Hoosac Tunnel Line.

Proposals will be received at the office of Mr. J. Prescott, Manager of the tunnel and State road, for the grading, masonry and completing of the Troy & Greenfield road between Bardwell's Ferry and Greenfield, about eight miles. Plans, profiles and estimates may be obtained at the Manager's office in Greenfield, Mass., after July 27, and bids must be sent to the same office by noon of August 3.

ANNUAL REPORTS.

Georgia.

This company owns and works the following lines:

	Miles.
Main Line, Augusta, Ga., west to Atlanta	171
Athens Branch, Union Point, Ga., to Athens	39
Washington Branch, Barnett, Ga., to Washington	18
Total	228

It also works under lease the Macon & Augusta road, from Camak, Ga., southwest to Macon 78 miles, three miles of which, from Camak to Warrenton it owns. The accounts of this line are kept separately.

At the close of the fiscal year, March 31, 1875, the company owned 54 engines, of which four are reported as needing extensive repairs; 28 passenger, 12 baggage, 3 mail and 3 express cars; 545 box, 35 stock, 128 platform, 65 coal and 22 cab cars; 1 pay-car, 24 shanty and 2 wood cars; a total of 46 passenger-train, 795 freight-train and 27 service cars. During the year one baggage, 15 box, 40 coal and 2 cab cars were built, 2 passenger and 30 box cars bought. One passenger and one baggage car were condemned.

This property is represented by the following securities:

Stock ($18,182 per mile owned)	$4,200,000
Bonds ($2,444 per mile)	564,500
Total ($20,626 per mile)	$4,764,500

The bonded debt has been decreased by $43,500 during the year. The company is liable as indorser on $500,000 Port Royal railroad bonds, which, however, are in dispute, and is also indorser, jointly with the Central of Georgia, on $1,200,000 Western of Alabama bonds. It recently, also jointly with the Central, bought the Western road at foreclosure sale, the two companies jointly assuming the unindorsed bonds, amounting to $1,350,000. It also guarantees, under the lease, the interest of $670,000 Macon & Augusta bonds.

On the other hand, the company owns $730,902 stock, and $144,760 bonds of various railroad and steamship companies, and has claims for advances made to the amount of $57,993 to the Port Royal, $256,677 to the Western of Alabama, and $142,016 to the Macon & Augusta Company.

The earnings and expenses of the road for the fiscal year ending with March, were as follows:

	1874-75.	1873-74.	Inc. or Dec.	
From passengers	$272,487.76	$307,047.23	Dec.	$34,559.47
Freight	983,864.52	1,239,336.69	Dec.	255,472.17
Mails	25,554.96	25,401.10	Inc.	153.86
Total earnings	$1,281,907.24	$1,571,785.02	Dec.	$289,877.78
Conducting transportation	230,455.94	265,445.59	Dec.	34,989.65
Motive power	283,991.28	349,439.55	Dec.	65,448.27
Maintenance of way	243,094.98	212,044.76	Inc.	31,050.22
Maintenance of cars	68,555.70	60,521.09	Inc.	8,034.61
Total Expenses	$826,097.90	$887,450.99	Dec.	$61,353.09
Net earnings	$455,809.34	$684,334.03	Dec.	$228,524.69
Extraordinary expenses	105,720.19	157,755.74	Dec.	52,035.55
Surplus	$350,089.15	$526,578.29	Dec.	$176,489.14
Gross earnings per mile	5,622.40	6,893.81	Dec.	1,271.41
Net earnings per mile	1,999.16	3,001.47	Dec.	1,002.31
Per cent. ordinary expenses	64.44	56.46	Inc.	7.98
Per cent. all expenses	72.09	66.50	Inc.	6.19

The decrease in earnings was 18.4 per cent.; in expenses 6.9 per cent.; in net earnings 33.4 per cent., and in surplus 33.5 per cent. The extraordinary expenses in both years were nearly all for new equipment.

The two largest items of decrease were in the local freight and in the through freight bound south and east. The former was mainly caused by the reductions in the tariff made necessary by the decision of the Supreme Court, that the company can only charge the rates given in the charter for 100 miles, and in that exact proportion for any distance less than 100 miles. The latter was chiefly the result of competition arising from the efforts of the Chesapeake & Ohio and its connections south from Richmond to secure through freight from the West to Southern sea-board ports. Speaking of this business, the General Superintendent's report says: "I know it is believed by some that this through business does not pay well, but the facts are that upon this business there has been less reduction made than upon through merchandise and through cotton. At present, on an average, the Georgia Railroad receives about $30 per car-load on all freight shipped from Nashville and points west of Nashville to Augusta. When it passes through Augusta to points of greater competition, your road's proportion is less, but on all freights shipped to way stations on your road, and from stations south of Nashville, the proportion of the Georgia Railroad is considerably more than stated above. On through cotton from Atlanta to the East, for last season, the proportion to your road averaged about 25 cents per 100 pounds, or about $30 per car, allowing 12,000 lbs. of uncompressed cotton to the car; and on through cotton uncompressed, from points west of Atlanta, only about 15 cents per 100 lbs. or $18 per car load of 12,000 lbs. Compressed cotton pays better at the same rate, as, with it, the car can be loaded to its capacity; but, unfortunately, very little of the cotton offered to your road is compressed."

A partial comparison of the work of the year with the previous two, is as follows:

	1874-75.	1873-74.	1872-73.
Train mileage	1,140,269	1,140,055	1,108,551
Bales cotton carried	219,593	273,293	294,300
Bushels grain "	1,851,733	1,107,382	1,897,640
Barrels flour "	146,292	123,209	96,181

During the year 1,809 tons of re-rolled iron were used in repairs of road, and 502 tons of old rails were repaired in the shop at Union Point. A large number of new ties and a great deal of bridge lumber were used.

The earnings and expenses of the Macon & Augusta road for the year were as follows:

	1874-75.	1873-74.	Inc. or Dec.	
Passengers and mails	$38,267 93	$42,963 52	Dec..	$4,695 59
Freight	77,182 86	78,410 99	Dec..	1,228 13
Total earnings	$115,450 79	$121,374 51	Dec..	$5,923 72
Working expenses	103,364 00	100,405 69	Inc..	2,958 31
Net earnings	$12,086 79	$20,968 82	Dec..	$8,882 03
Gross earnings per mile	1,480 14	1,556 08	Dec..	75 94
Net earnings per mile	154 96	268 83	Dec..	113 87
Per cent. of expenses	89.53	82.72	Inc..	6.81

The decrease in gross earnings was 4⅞ per cent.; the increase in expenses, 3 per cent.; the decrease in net earnings 42¾ per cent. During the year 30,000 new ties were used in repairs, 18 treatles and six bridges partly rebuilt, a new bridge built over the Central road near Macon, and the embankment through the Ocmulgee Swamp raised two feet. The road was also ditched.

Train Accidents in June.

On the morning of the 1st the engine and three cars of a train on the Pittsburgh, Cincinnati & St. Louis road were thrown from the track near Cambridge City, Ind., at a place where an embankment had been washed out during a heavy rain storm.

On the morning of the 1st a passenger train on the Erie Railway ran into the rear of a wild train near Lackawaxen, Pa., wrecking several cars.

On the night of the 1st a freight train on the Cairo & Vincennes road ran over a bull near Mound City, Ill., and two cars were thrown from the track and wrecked.

On the 2d, on the Cleveland, Columbus, Cincinnati & Indianapolis road, near Pendleton, Ind., a freight train went into a small stream where a trestle bridge had been carried away a short time before, during a heavy rain storm. The engine was buried in the mud and the cars were badly wrecked and piled up over and around the engine. The engineman and fireman were killed and a brakeman badly hurt.

On the 2d the engine and baggage car of an express train on the Columbus, Chicago & Indiana Central road were thrown from the track and upset near Cambridge, Ind., at a place where the road-bed had been washed out during a heavy storm. The engineman and fireman were hurt.

Near noon on the 3d, a freight train on the Philadelphia & Baltimore Central road ran upon a misplaced switch at West Branch, Pa., and the engine and several cars went down a bank and were badly broken. The engineman and fireman were injured.

On the 3d, an engine attached to a gravel train on the New York Central & Hudson River exploded its boiler while standing on a siding at Rhinebeck, N. Y. The back end of the engine was destroyed, the tender damaged and the engineer and fireman very badly hurt.

On the 3d, the tender of a wild engine on the Grand River Valley Division of the Michigan Central road jumped the track near Hastings, Mich., killing two men who were riding on it.

On the morning of the 4th, the engine of a stock train on the Erie Railway blew out a cylinder head while passing through Paterson, N. J., disabling the engine and delaying the train.

On the morning of the 4th, the engine and some cars of a working train on the Grand River Valley Division of the Michigan Central were thrown from the track by a telegraph pole which had fallen across the track. Two section hands were killed and the engineman and conductor hurt.

On the 4th, seven cars of a freight train on the Belleville & Southern Illinois road ran off the track near New Athens, Ill., blocking the track some time.

On the evening of the 4th, a freight train on the Texas & Pacific road ran off the track near Hallville, Tex., wrecking several cars.

On the night of the 4th, on the Cincinnati, Sandusky & Cleveland road, the boiler of a locomotive exploded, killing the engineer and badly injuring the fireman and another man.

Early on the morning of the 6th, three cars of an express train on the Flint & Pere Marquette road were thrown from the track by a defective frog in East Saginaw, Mich. The baggage car, which led, ran into a freight car standing on a siding, breaking both badly and injuring the baggageman.

On the 9th, the engine and three cars of a train on the St. Paul & Sioux City road were thrown from the track near Minneopa, Minn., by the spreading of the rails, blocking the road several hours.

On the evening of the 9th, the baggage and express cars of a passenger train on the Atlantic & Gulf road were thrown from the track near Sanderson, Ga., by a stick of wood which had fallen from the tender. The track was blocked some six hours. The express cars were badly broken.

On the morning of the 10th, a freight train on the Quincy, Alton & St. Louis road was thrown from the track near Millville, Ill., by some stones which fell from a flat car on the train. Twelve cars were wrecked and a brakeman hurt.

On the evening of the 11th, three cars of a freight train on the Macon & Brunswick road were thrown from the track and upset at the Ocmulgee Bridge, Ga. The cars were badly broken.

Very early on the morning of the 12th, the caboose of the freight train on the Northern Central road broke loose from the train near Phœnix, Md., and a few minutes afterward a following freight train ran into it, breaking up the car and killing the conductor, who was on it.

On the morning of the 12th, on the Baltimore & Potomac road, near Baltimore, Md., the tender of a passenger train ran off the track.

On the morning of the 12th the engine of a freight train on the Chicago & Alton road exploded its boiler near Bloomington, Ill., completely wrecking the engine and injuring the engineman.

On the 12th a coal train on the Baltimore & Ohio road ran into the rear of another near Mount Winans, Md., wrecking three cars.

Very late on the night of the 12th as the Boston express of the New York, New Haven & Hartford road was running southward on the Harlem track near Tremont, N. Y., it struck a horse which had strayed upon the line and the engine and several cars left the track, the two parlor cars being upset and badly broken. Four passengers were somewhat injured and a number were slightly bruised.

On the 13th the engine of a passenger train on the Memphis & Little Rock road was thrown from the track near Forrest City, Ark., by the breaking of an axle.

On the evening of the 13th a Chicago & Alton passenger train ran off the track on the east approach to the St. Louis bridge and was delayed some time.

On the night of the 14th, the engine of an express on the New York Central & Hudson River was thrown from the track in Utica, N. Y., by the spreading of the rails.

On the morning of the 15th, a construction train on the Utah Western road ran over a steer near Salt Lake, Utah, and several cars were thrown from the track. One man was hurt so that he died in a few hours.

On the afternoon of the 15th, a freight train on the Grand Trunk road ran over a cow near Mount Clemens, Mich., and the engine and several cars were thrown from the track. The engineman was killed and the fireman badly hurt.

On the night of the 15th, the engine of a train on the Belmont line of the St. Louis, Iron Mountain & Southern road ran off the track near Delassus, Mo., delaying the train all night.

On the morning of the 16th, a passenger train on the Lebanon Valley Branch of the Philadelphia & Reading road was thrown from the track by a misplaced switch at Robesonia, Pa. The engine was half buried in the mud and two cars were a good deal broken.

On the 16th, at Riverside, Me., on the Maine Central road, a passenger train ran over a misplaced switch and into the rear of a freight train which was standing on a siding. The passenger engine was wrecked and several cars badly damaged, and the engineman and mail agent were hurt.

On the 16th, on the Dakota division of the Northern Pacific road, a passenger train was thrown from the track, killing two men.

Early on the afternoon of the 16th, a section of a coal train on the Honesdale branch of the Erie, ran into the rear of a preceding section near Kimble's Pa., wrecking three cars completely and damaging five others and the engine. The fireman was injured.

On the afternoon of the 16th, as a train was running up a grade in Indianapolis, Ind., on the Columbus, Chicago & Indiana Central road, a cross-head broke and the cylinder head was knocked out.

On the night of the 16th, four cars of a freight train on the Illinois Central ran off the track near Kankakee, Ill., blocking the road nearly 12 hours.

Very late on the night of the 16th, as two sections of a freight train on the Burlington & Missouri River road were running eastward, the first section stopped at Chariton, Ia. The usual signals were put out and were seen by the second train, but the high wind and wet track prevented it from stopping, though the brakes were put on and the engine reversed, and it ran into the rear of the first train, destroying several cars, killing five and wounding eight persons who were in the caboose.

Very early on the morning of the 17th, a train on the Logansport, Crawfordsville & Southwestern road ran into a Terre Haute & Indianapolis train at the crossing of the two roads in Terre Haute, Ind. A sleeping coach was wrecked and several other cars damaged.

On the morning of the 17th, the engine of a train on the North Wisconsin road was thrown from the track near Bass Lake, Minn., by a rail which had been laid across the track.

On the morning of the 17th, on the Louisville, Cincinnati & Lexington road, near Carrollton, Ky., the rear truck of the tender broke down as a train was passing over a trestle, letting the end of the tender fall on the track. It ran across the trestle in this way until just at the end of it a rail gave way and the baggage car, smoking and palace cars went down a bank 30 feet, injuring six persons. Just at that moment an east-bound express came up and was stopped by the air brakes just in time to clear the wreck. Both trains were running against time.

On the 17th, near Wilkesbarre, Pa., on the Lehigh & Susquehanna Division of the Central Railroad of New Jersey, a coal train was thrown from the track by a misplaced switch. The engine upset and the engineman was fatally hurt.

On the night of the 17th, nine cars of a freight train on the Burlington & Missouri River road were thrown from the track near Lucas, Ia., by the spreading of the rails at a point where the road-bed had been badly washed during a storm. A tramp, who was stealing a ride, was killed.

On the 18th, on the Toledo, Wabash & Western road, near Worden, Ill., there was a butting collision between a freight and the pay train, wrecking both engines and some cars, severely injuring Paymaster Carpenter and bruising some others. It is reported that the freight ran by a green flag. A construction engine was sent after it and caught it, delivering orders, which, it is claimed, should have caused it to back up to the station last passed. The conductor, however, thought that he had the right to proceed, and did so, the collision being the result.

On the evening of the 18th, a passenger train on the Southwestern Division of the Chicago, Rock Island & Pacific, ran from the track near Plattsburg, Mo., at a place where a small bridge had been carried away during a heavy rain-storm. The whole train was badly wrecked; the fireman and a passenger killed, and six persons hurt.

On the night of the 18th, between Quincy, Ill., and Hannibal, on the Quincy, Alton & St. Louis road, the coach of a mixed train struck the end of a split rail and left the track, delaying trains four hours.

On the morning of the 19th, the smoking and baggage cars of a north-bound express train ran off the track at the junction of the Union and the Philadelphia, Wilmington & Baltimore roads at Bay View, Md. Both cars were damaged.

On the 19th, a passenger train on the St. Louis, Kansas City & Northern road was thrown from the track near the Harlem Junction, Mo., where a culvert had been washed out by a heavy storm.

On the night of the 19th, near Sedalia, Mo., on the Missouri, Kansas & Texas road, a passenger train was thrown from the track at a place where the road-bed had been washed out by a heavy rain-storm.

Late on the night of the 20th, the engine of a train on the Cincinnati, Hamilton & Indianapolis road struck a switch which had been purposely misplaced, near Hamilton, O., and the engine ran off the track and upset, killing the fireman and injuring the engineman.

On the night of the 21st, a passenger train on the Prairie du Chien Division of the Chicago, Milwaukee & St. Paul struck a tie which had been laid across the rails, and the engine ran off the track and was slightly damaged.

On the afternoon of the 22d a passenger train on the Toledo, Wabash & Western road struck a misplaced switch at Springfield, Ill., and the whole train left the track, injuring two passengers and a section-hand who was standing by the track.

On the 23d, at Ferris Station, Ill., on the Chicago, Burlington & Quincy road, the caboose of a freight train jumped the track in backing into a siding. The trucks sank into the mud, and trains were delayed over six hours.

On the night of the 23d the engine of a passenger train on the Indianapolis, Bloomington & Western road ran off the track in Indianapolis, Ind., blocking the road two hours.

On the night of the 23d there was a butting collision between a freight and a stock train on the St. Louis, Iron Mountain & Southern road near Bradford, Ark., by which both engines and several cars were wrecked. It is said that the conductor of a south-bound passenger train was to have given orders to the freight to wait for the stock train at Russell, but neglected to do so.

On the night of the 24th, the west-bound express train on the West Wisconsin road, struck some ties which had been placed upright in a cattle-guard near Augusta, Wis. The engine ran off the track and turned completely round, the tender passing over it, while the baggage car went off the track and upset in the ditch. Several other cars also went off, and the road was blocked eight hours.

On the morning of the 25th, on the Utica Division of the Delaware, Lackawanna & Western, near Sherburne, N. Y., an express train was thrown from the track, apparently by a broken flange in an engine truck wheel. The engine ran 150 feet on the ties, and then went into the ditch and upset, while the mail and smoking-cars also went into the ditch. The fireman was caught between the engine and tender and crushed to death.

On the morning of the 25th, at Susquehanna, Pa., on the Erie Railway, there was a butting collision between a passenger and a freight train, by which both engines and several cars were badly damaged.

On the afternoon of the 25th, at Springfield, Mass., on the Connecticut River road, a switch engine started while the engineman was away, and after running some way up the road ran off a switch and stopped two feet deep in sand. The outward track was blocked for some hours.

On the night of the 26th, a mixed train on the Allegheny Valley road ran over a misplaced switch at Oil City, Pa., and the engine, tender and two freight cars went off the track and down a high bank, all of them being badly wrecked. It is believed that the switch was purposely misplaced.

On the morning of the 28th, on the Central Railroad of New Jersey, at Lebanon, N. J., several cars were thrown from the track and wrecked as the train was trying to run them on a siding by a flying switch It is said that the brakes would not hold, the speed being too high on a heavy grade.

On the 28th there was a collision between two trains on the Central Pacific, near Ogden, Utah, by which one passenger was badly hurt.

Soon after noon on the 30th, there was a butting collision between an east-bound passenger and a west-bound mail train on the Detroit & Milwaukee road, near Holly, Mich., by which both engines were badly wrecked and several cars damaged, and the road blocked six hours. Both conductors jumped and were hurt and the baggage-master, mail agent and 15 passengers in an emigrant car attached to the mail were injured. The mail train, which was nearly two hours behind time, should have waited for the other train at Holly, but the conductor and engineman forgot about it, the other train being a new one just put on that day. Both are old employes on the road.

This is a total of 61 accidents, whereby 23 persons were killed and 67 injured. Fourteen accidents caused the death of one or more persons, 14 others injury but not death, while 33, or 54 per cent. of the whole number, caused no serious injury to any person.

These accidents may be classified as to their nature and causes as follows:

COLLISIONS:		
Rear collisions	6	
Butting collisions	4	
Crossing collisions	1	
Unexplained	1	
		— 12
DERAILMENTS:		
Unexplained	12	
Wash-out	7	
Misplaced switch	6	
Cattle on track	4	
Accidental obstruction	3	
Malicious obstruction	3	
Spreading of rails	2	
Defective rail	1	
Defective frog	1	
Broken axle	1	
Broken wheel	1	
Broken truck	1	
Runaway engine	1	
Flying switch	1	
		— 44
Boiler explosion	3	
Cylinder head blown out	1	
Crosshead broken	1	
Total	61	

Three collisions were caused by failure to deliver or by mistake in receiving orders, one by failure of brakes to hold a train, one by a misplaced switch and one by a train breaking in two. The number of misplaced switches is again unpleasantly large; two of them were purposely set wrong, making, with three malicious obstructions, five cases of train wrecking during the month. Fourteen accidents were directly caused by defects or failures of road or equipment. As usual at this season the wash-outs and cattle on the track cause many accidents.

The number of accidents was very small, though more are recorded than in either April or May. The second quarter of the year with 175 accidents presents a sharp contrast to the first quarter, when 464 were recorded, or more than two and one-half times as many. The number of persons killed is unusually large in proportion to the number of accidents. As compared with June of last year there is a decrease of 22 accidents, an increase of one in the number killed and of 12 wounded.

For the year ending with June the record is as follows:

	No. of accidents.	Killed.	Injured.
July	64	20	104
August	73	16	77
September	80	27	108
October	81	16	80
November	82	13	69
December	74	12	49
January	131	10	98
February	211	11	186
March	122	17	73
April	60	9	67
May	54	6	43
June	61	23	67
Totals	1,102	180	966

The averages per day for the month were 2.03 accidents, 0.77 killed and 2.23 injured; for the year they were 3.02 accidents, 0.49 killed and 2.79 injured.

During the first half of 1875 there are recorded 639 accidents, 76 persons killed and 532 injured, a daily average of 3.53 accidents 0.42 killed and 2.94 injured. These averages for the half year are thus, except in the number killed, considerably higher than for the year.

LOCOMOTIVE RETURNS, MARCH, 1875.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

NAME OF ROAD.	Number of miles operated	Number of Locomotives in service	Mileage. Total	Mileage. Average per Engine	No. Miles run to. Ton of Coal	No. Miles run to. Cord of Wood	No. Miles run to. Pint of Oil	Average No. of freight cars hauled	Cost per Mile in Cents for. Repairs	Fuel	Stores	Miscellaneous	Engine'rs, firemen and wipers	Total	Av'ge cost of. Coal, per ton or bushel	Wood, per cord
Allegheny Valley	259	59	135,571	2,298	33.70	.....	19.90	.....	4.50	4.46	0.88	.....	7.46	17.30	$1.13	$2.70
Atlantic & Great West'n (First & Second Div.)	228	80	194,856	2,435	34.98	.....	18.55	.....	4.09	6.54	0.56	0.87	6.36	18.42	2.14	3.27
" " (Third & Fourth Div.	197	48	107,668	2,243	34.98	.....	21.31	.....	5.06	6.54	0.45	0.97	5.98	19.00	2.14	3.27
" " (Mahoning Division)	121	43	99 957	2,243	34.98	.....	18.12	.....	4.31	6.54	0.41	0.75	6.08	18.09	2.14	3.27
Camden & Atlantic	67	11	16,644	1,513	73.80	.....	22 51	.....	5.63	7 17	0.69	.....	5.49	19.00	5.87	.....
Central Pacific (Western Division)	173.4	42	116 699	2,778	44.47	.....	17.95	.....	7.95	17.93	0.78	0.60	7.98	32.24	8.00	5.10
" " (Sacramento Division)	119.5	35	91,919	2 626	.....	29.08	16.03	.....	9.23	17.54	0.84	0.83	8.72	37.16	.....	5 10
" " (Truckee Division)	204.5	27	67,768	2,508	36.57	8.10	15.92	.....	23.94	20.10	0.76	0.73	8.84	54 37	8.00	5 10
" " (Humboldt Division)	236.6	24	65.831	2,992	36.77	.....	15.96	.....	5.58	21.71	0.73	0.52	7.87	36 11	8.00	5.10
" " (Salt Lake Division)	182.8	25	70,745	2,810	34.79	.....	16.57	.....	8.50	22.95	0 73	0.51	7.38	40.07	8.00	5.10
" " (Oregon Division)	151.42	8	21 362	2,670	.....	40.69	23 76	.....	8.94	12 53	0.62	0.56	7.71	30.36	.....	5.10
" " (Virgilia Division)	188.3	13	33 855	2,450	49.47	50.00	19.59	.....	7.15	15.59	0 69	0.58	7.10	31.11	8.00	5.10
Chicago, Burlington & Quincy (Aurora Div.)*	.....	104	204,181	1,968	.....	.....	.....	18.59	.....	.....	.....	.....	.....	39 18	2.50	4 25
" " " (Galesb'g Div.)*	.....	90	193 585	2,151	.....	.....	.....	17.67	.....	.....	.....	.....	.....	29.52	2.50	4.25
" " " (Burl'gt'nDiv.)*	.....	38	96.243	2 533	.....	.....	.....	16.29	.....	.....	.....	.....	.....	34.62	2 50	4.25
" " " (Creston Div.)*	.....	70	197 572	2,822	.....	.....	.....	20.01	.....	.....	.....	.....	.....	22.22	2 50	4 75
Cleve., Col., Cin. & Ind. (Columbus Div.)	138	55	152 887	2,416	42.52	72.98	39 85	.....	2.76	6.21	0.54	.....	6.60	16.11	2.44	3.50
" " " (Indianapolis Div.)	207	63	174 582	2,771	43.24	41.19	26.15	.....	4.95	5 50	0.60	.....	6 60	17.65	2.00	3.50
" " " (Cincinnati Div.)	130	28	73,060	2,609	39.97	.....	24.37	.....	2.19	5.50	0.54	.....	6.71	14.94	2.00	3 50
Cleveland & Pittsburgh	199	79	149,842	1.897	64.39	.....	20.73	.....	4 44	3.56	0 63	3.05	7.20	18.88	2.00	1.95
Del., Lacka. & West. (Bloomsburg Div.)	80	23	46 390	2.017	.....	.....	24.99	.....	5.26	.....	0.78	.....	6.59	12.63	.....	.....
Flint & Pere Marquette	289	..	106 956	.....	.....	46.72	21.37	.....	4.70	9.63	0.61	.....	6.42	21.36	.....	4.50
Hannibal & St. Joseph	294	58	120 208	2,074	38.90	.....	17.90	.....	7.00	6 80	0 40	.....	7.20	21.40	2 70	3.60
Illinois Central (Chicago Div.)	252.5	66	189,723	2,853	38.66	.....	14.31	16.06	6.07	4.81	0 34	.....	6.53	17.77	1.80	4.25
" " (South Div.)	230.75	55	98,356	2 810	35.29	.....	3.20	15 72	6 40	5.40	0.42	.....	6.50	18 82	1 80	4.25
" " (North Div.)	225	45	121,250	2,694	30.78	.....	14 54	12.71	10.43	6.18	0.38	.....	6.67	23.66	1.80	4.25
" " (Iowa Div.)	401	44	125,335	2,939	31.19	.....	14 39	10.39	5.75	7.62	0.31	.....	7.24	20.92	2.50	4 75
Jeffersonville, Madison & Indianapolis	226	42	93,851	2,235	45.00	29.86	19.77	.....	3.76	6.30	0 42	2.74	6.92	20.14	2.50	2.90
Kansas Pacific, Main Line†	673	86	141,738	1 648	79.47	.....	12.32	.....	6.01	11.12	0.35	.....	7.29	24.97	3.25	2.84
including branches†	895	94	160 693	1.710	30.25	.....	12.49	.....	5.37	11.17	0.54	.....	7.37	24.45	3.25	3.02
Lake Shore & Mich. South. Buffalo Div.)‡	.....	93	186.941	2.010	41.89	40.71	16.59	.....	5.50	8.36	.....	.....	6.49	20.34	3.50	3.50
" " (Erie Div.)‡	.....	114	226.132	1,984	39.34	53.09	20.61	.....	6.33	8.98	.....	.....	6.66	21.97	3.50	4.00
" " (Toledo Div.)‡	.....	79	174.009	2,203	33.9	49.84	13.74	.....	4.44	11.19	.....	.....	6.60	22.23	4.00	4.0
" " (Mich.South. Div.)‡	.....	219	489 270	2 341	46.34	55.65	19.72	.....	4.20	8.49	.....	.....	6 89	19.58	4.50	3.50
Leavenworth, Lawrence & Galveston	203.7	18	20 800	1,155	59.70	.....	28 00	.....	6.55	6.43	0.34	.....	5.79	18.61	3.62	3.80
Marquette, Houghton & Ontonagon	.....	30	16,210	540	45.79	.....	21.96	.....	4.88	15.92	0.9	.....	9.76	31.47	.....	.....
Northern Central (Elmira & Canandaigua Div.)	147	41	70,550	1 7 6	26.96	.....	18.52	.....	7.24	10.05	0.78	.....	6.21	24.28	0.69	3.04
Pennsylvania (New York Division)	119.9	112	267,935	2,392	31.42	.....	9.86	.....	6.50	14.80	1.40	.....	.....	22.70	0.16	6.96
" (Amboy Division)	154.2	54	83.5 4	1,547	47.11	.....	14.62	.....	7.20	9.80	0.90	.....	.....	17.90	0.16	6.97
" (Belvidere Division)	102.5	27	49 977	1,851	48.17	.....	14.33	.....	4. 0	9.50	1.20	.....	.....	14.70	0.16	6.85
" (Philadelphia Division)	204.3	158	400.6 8	2,536	28.93	.....	13.66	.....	3.60	5.10	0 90	.....	.....	9.60	0.05	3.44
" (Middle Division)	131.6	129	335.243	2,599	29.94	.....	20.58	.....	4.70	4.90	0.70	.....	.....	10.30	0.05	3.44
" (Pittsburgh Division, East End)	.....	65	128,190	1,972	21.33	.....	11.71	.....	5.50	6.8	1.10	.....	.....	13.40	0.05	3.44
" (Pittsburgh Division, West End)	.....	103	247.077	2,399	3 .85	.....	13.77	.....	11.35	4.48	0.83	.....	.....	6 67	0.05	3.44
" (Tyrone Division)	106.8	32	65.072	2,034	23.70	.....	17.67	.....	10.00	6.20	0.70	.....	.....	16.90	0.05	3.45
" (West Pennsylvania Division)	103.6	23	47,727	2,075	40.16	.....	31.85	.....	2.90	3.90	0.40	.....	.....	7.20	0 05	3 45
" (Lewistown Division)	12.5	2	4.348	3.174	61.04	.....	21 74	.....	4.00	2.70	0.50	.....	.....	7.20	0 05	3.53
" (Bedford Division)	56.5	7	11,807	1,687	48 52	.....	20.58	.....	6.40	3.20	0.60	.....	.....	10.30	0 05	3.44
Pitts., Fort Wayne & Chicago (Eastern Div.)‖	468.9	180	421,46	2,339	7.94	.....	18.09	12 70	3.42	4.46	0.78	1.38	6.47	16.51	1.69	1.69
" " " (Western Div.)‖	280	107	301,913	2,822	40 40	.....	17.56	16.60	3.90	5.60	0.50	1.30	6.50	17.80	1.99	1.19
Pitts., Cin. & St. Louis (Little Miami Div.)	197	38	101,559	2,673	42.40	.....	14.27	.....	5.18	4.42	0.96	2.09	6.86	19.51	1.75	2.74
" " (Pittsb. & Col. Div.)	224	97	257.406	2,654	28.77	.....	14.19	.....	4.92	4.98	0 94	2.43	6 77	20 04	1.25	3.60
St. Louis, I. M. & South (Arkansas Div.)	305	....	66 435	.....	.....	41 50	21.40	.....	2.68	5.64	0.53	.....	6.97	15.82	.....	2.24
Stockton & Copperopolis	49	2	3,917	1,959	.....	60.73	18.74	.....	1.92	8.23	0.78	1.84	8 21	20.98	.....	5.00
South Carolina	242	38	88,161	2,320	.....	43.21	27.03	.....	5.49	5.89	0.73	.....	.....	12,11	.....	2 55
Terre Haute & Indianapolis (Indianap. Div.)	112.63	....	71, 50	.....	38.40	.....	19.30	.....	6.3	6.86	0.83	.....	8.13	22.14	1.95	.....
" " (Vandalia Div.)	158.30	....	80,089	.....	32.80	.....	21.70	.....	6.69	4.14	1.02	.....	7.86	19.71	1.35	.....
Texas & Pacific	323	....	73 654	.....	.....	41.70	15.60	.....	3.58	8.39	0.39	1.04	6.29	19 69	.....	3.50
West Jersey	128	16	28,838	1,802	41.81	36 10	17.92	.....	2.90	9 80	0.10	.....	.....	13 40	0.16	2.53

* Three empty c rs rated as two loaded ones.
† Switching and work train engines allowed 60 miles per day.
‡ Switching engines allowed 6 miles per hour.
‖ Two empty cars counted as one loaded one.

Board for Testing Metals.

At a meeting of the United States Board, appointed to test iron, steel and other metals, held at Watertown Arsenal, June 21, 1875, the following preamble and resolutions were adopted:

Whereas, This Board proposes, as soon as practicable, to give metal makers the benefit of its testing machines, and of a skilled experimenter, at a reasonable charge, as a means by which they may give publicity to the behavior of their metals under test; it is

Resolved, That this Board decline to publish the names of metal makers in connection with the experiments certified to by the Board.

Resolved, That this resolution is not to be construed as a refusal to acknowledge contributions of metals and other aid from makers; on the contrary, such services will always be gratefully and publicly acknowledged.

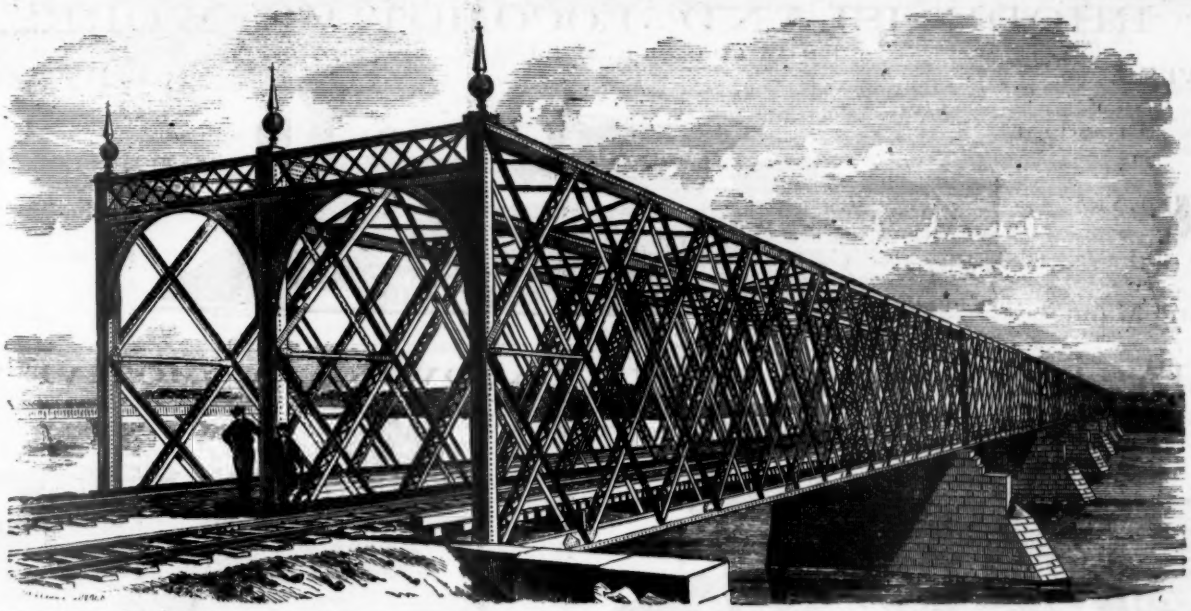
Published by order of the Board.

R. H. THURSTON, Secretary.

Leighton Bridge & Iron Works,

ROCHESTER, N. Y.

Wrought-Iron Riveted Lattice Railroad and Highway Bridges.



WROUGHT-IRON WATER PIPE AND GENERAL RIVETED WORK.

ORDERS SOLICITED FROM CIVIL ENGINEERS AND CONTRACTORS.

[Accompanying engraving represents the Springfield Bridge, built by the Leighton Bridge & Iron Works.]

NATIONAL BRIDGE AND IRON WORKS.

General Office, 32 Hawley Street, Boston..... .....Works at East Boston.

Contractors for building and erecting long and short spans wrought iron railway and highway bridges, viaducts, turn-tables, iron girder beams, roof trusses and general architectural iron work.

CHAS. H. PARKER and CAREY B. DOPP.....Proprietors.
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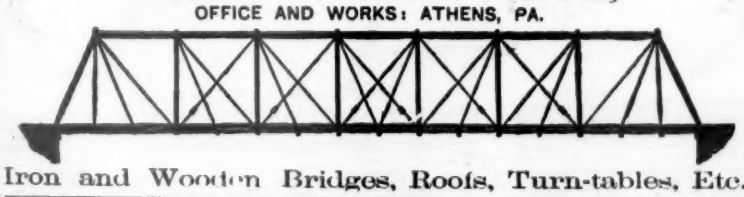

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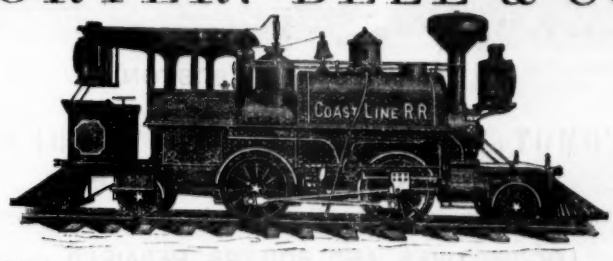

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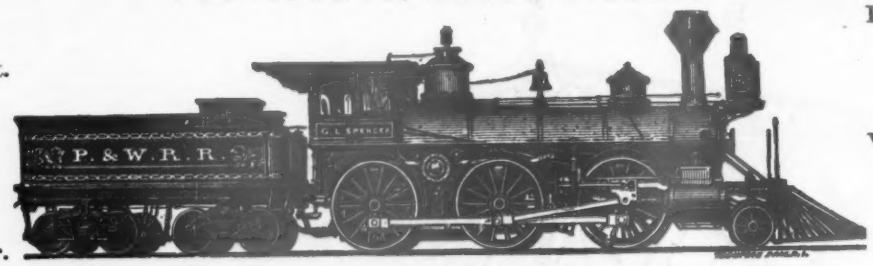

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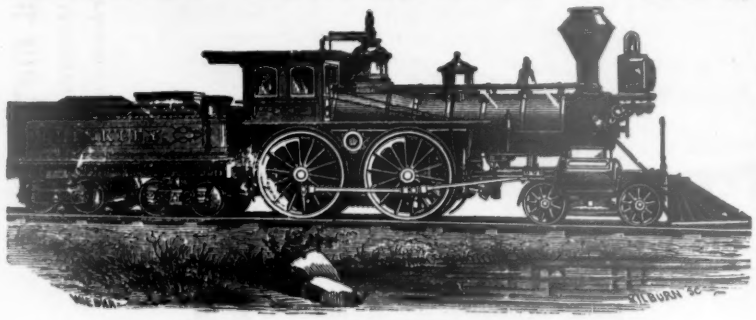

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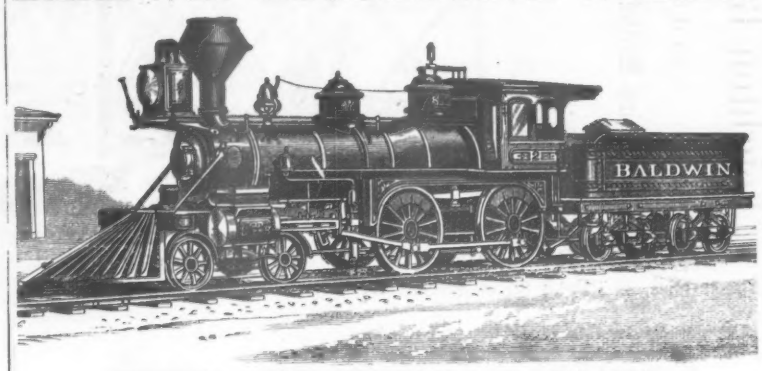

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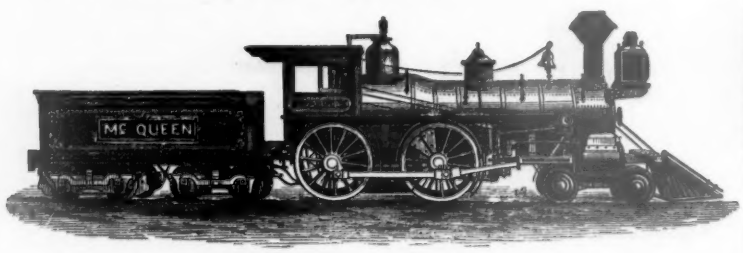

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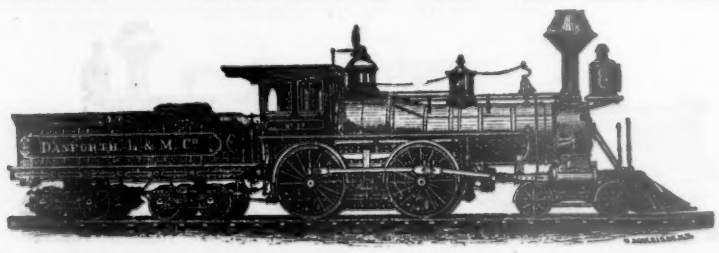

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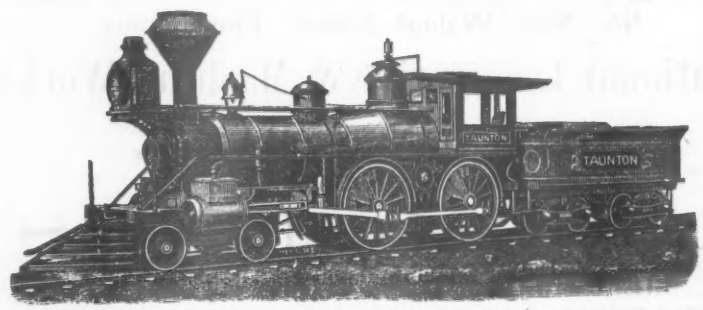

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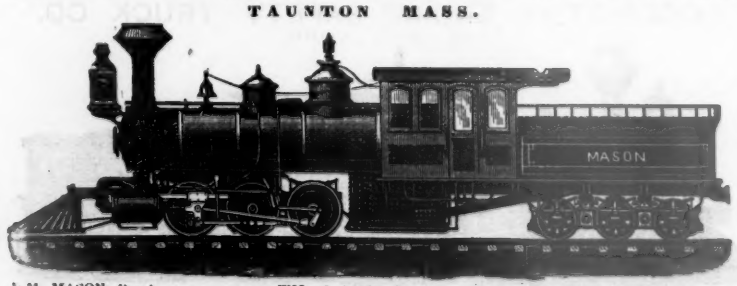

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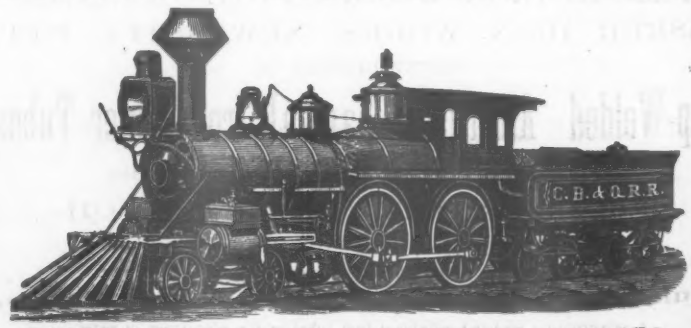

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